Analysis of the differences between private and public schools on their effectiveness on school achievement

ERIC FUNDED PROJECT

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(National Council of Educational Research and Training)

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M.A. Khader

INTRODUCTION

Background of the study

Current concern on school quality underscores the need to examine the effect of schools on students' learning. Though school effectiveness has several dimensions, the differences between private and public (Government) schools on their effectiveness on students' learning is a major concern for educational researchers, policy makers and even parents. Parents, by citing data based on school board examination results, often argue that private schools excel public schools on academic performance. For instance, Secondary School Leaving Certificate (SSLC) examination result (Class X), May 1988, Board of Secondary Education, Kerala State provides convincing evidence to this line of arguement. Despite high literacy rate and a well structured system of schooling in Kerala, only 132 schools could attain 100 percent pass in the SSLC examination in May 1988. It is striking to note that only 5 out of 132 are public schools. Of the remaining 127 schools, approximately 94 are Christian Missionary Schools. This pattern continues to appear and reappear in the 1989, 1990 and 1991 SSLC examination results. Such observations, naturally, raise questions like; why does private school excel public school in academic achievement; does private school have more effective learning environment than public school; and which features of the school are important in explaining academic performance? These are the questions that prompted this study.

Evidences from school effectiveness researches

In the last three decades, the effectiveness of schools has been a great concern for educational researches and policy planners. This concern stemmed from greater commitment of central and state governments in education and subsequent increase in the number of schools during the post-independent period as well as the academic interest generated by school effectiveness researches elsewhere in the world.

Evidences from major initial researches do not support school effectiveness hypothesis. Coleman et al's (1966) study, for instance,

conclude that when home background variables are controlled, school characteristics and resources appear to make little difference in students' level of achievement. However, the study did suggest that schools' social class composition and teachers' verbal ability could make a difference in pupils' achievement. Likewise, Jencks et al's (1972) study conclude that equalizing the quality of high schools would reduce cognitive inequality by one percent or less and that additional school expenditures are unlikely to increase achievement and redistributing resources will not reduce test score inequality. These startling evidences coupled with Jensen's (1969) controversial conclusion that compensatory education has been tried and it apparently has failed, raised serious doubts on the effectiveness of school and at the same time generated debates and series of research activities on the theme.

Reanalysis of Coleman data by Mayeske et al. (1973) using symmetric variance decomposition method demonstrates a greater percentage between school variance than the 10% obtained by Coleman. They further demonstrate that influence of home and school factors acting in concert suggesting a combined effect of home and school factors on achievement. Evidences from IEA studies reveal that the proportion of variance in achievement accounted for by the school on the whole is larger than in the Coleman study. But the home background variables consistently account for more variance than school variables on achievement (Postlethwaite, 1975). However, Madaus et al. (1976) and Brimer et al. (1977) show that schools have greater effects on examination success. Rutter et al's (1979) study reveals that large and statistically significant differences exist between secondary schools with respect to levels of attendance, children's behaviour in school, delinquency and academic achievement even after controlling the relevant intake variables. In otherwords, it means that schools do make a difference in students' achievement and related behaviours. Evidences further indicate that school climate characterised by social rewards for academic excellence where discipline and scholastic achievement are valued by teachers and students, and teaching and learning are structured and focused on scholastic goals, contributes to high student achievement (Walberg and Rasher, 1974; Bloom, 1976; Madaus, Kellaghan,

[illegible]low and King, 1979). Students' performances in selective and comprehensive schools reveal that the organizational features of schooling have influence on students' outcomes (Gray, McPherson and Raffe, 198[illegible], Steedman, 1983).

Keeves's (1972) analysis points out that structural characteristics of classroom - class size, average occupational status of the classroom group, and experience and specialist training of teachers - influence achievement in both mathematics and science. Children from culturally advantaged homes come together in schools where the average occupational status of the students of the class is high. Such classes are smaller and the students learn under better conditions. It is important to note that if science is taught by a teacher who is a specialist and also attended lectures to update knowledge in the subject, then the achievement in the subject would be raised. Similarly in mathematics, if the subject taught by a teacher who does not have to spend long hours in preparation, then a level of achievement would increase. The study further points out that interaction between teacher and student influences achievement and attitude towards mathematics and science. Does it mean that school matter only in mathematics and science achievements? In fact, Shaycoft (1967), IEA studies (Postlethwaite, 1975; Coleman, 1975) and Brimer et al.(1977) indicate that achievements in mathematics and science show greater school differences than the achievements in reading. Children generally learn science and mathematics from school while they learn reading in part from parents or family conversation as well as from books at home (Rutter 1979). It means that school differences are likely to be prominent in the achievement of such subjects that are learned mainly from school.

School effectiveness has been examined using organizational and institutional models and the evidences suggest that school effects may be most evident for particular subgroups of students between different levels of organization within and between schools and, between different institutions which cut across schools in the educational system (Cuttance, 1985). Though school effectiveness study is not free from problems of theoretical, methodology and research practices, emerging trend suggests important consequences for learner

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Method

Sample The study is operationalised based on a sample drawn from Kerala state. Units of observation are both school and student. Using stratified random sampling 10 high schools - 5 private (Christian Missionary) and 5 public (Government) - and 455 class X students were drawn from Calicut District, Kerala State. From the point of view of accessibility, operational effectiveness and similarity of social conditions, the sample was drawn from one district. Schools are stratified as high quality, average quality and low quality levels using pass percentages of schools in the class X board examination held in March, 1990. Though there are public schools with pass percentages below 20%, among private christian missionary schools within the district the lowest level is around 31%. On the other hand, there are private christian missionary schools with 100% pass but none of the public schools within the district indicates the same level of pass. As such schools with pass percentages 40 and below, 41 to 80 and 81 and above are treated as low quality, average quality and high quality schools. Selected schools and the pass percentages are shown in table-2.1. Though the schools are stratified based on 1990 pass percentages, 1991 pass percentages are also shown to identify the consistency of schools with in each stratum.

and institutional development (for details see Reynolds, 1985). What is striking in IEA studies is the considerable differences between countries in the relation between achievement, home and school variables. The proportion of variance in achievement accounted for by school factors is greater in developing countries than industrialised developed countries. The inference is that school conditions vary more in under developed countries than in developed ones and the converse is true for home conditions (Walker, 1975). Certainly this finding has important implications for India.

Private and Public Schools

India has a multiple system of schooling with central government, Navodaya, public, ICSE and private schools which can be categorised as private and public (Government) Schools to meet the educational needs of children. What makes this multiple system problematic from the equity perspective is that certain type of schools enrol students from higher social origin and help to learn academic and socialization skills to perform adult roles successfully. Such schools are highly academic oriented and unfortunately, they are not the ones that typically serve poor and working class children. It is natural, then, to find lower class children in schools that compound rather than alleviate their educational problems. Researches, by and large, are conclusive about low achievement of low income groups (Lewis, 1978). In fact, who goes to what type of school is determined by the social origin of children (Khader, forth coming) and it mirrors the social class stratifica tion system with in the society (Schneider, 1989).

Evidences from researches point out that private schools as compared to public schools are often identified with better organizational structure and more competent students (Sinha, 1980). Which school whether private or public, one attends has important consequences for academic achievement (Khader, 1985; Veeraraghavan and Bhattacharya, 1989). It is interesting to note that poor and minority children attending catholic schools out perform poor and minority students in public schools (Coleman, Hoffer and Kilgore, 1982;

Coleman and Hoffer, 1987). Similarly it has been observed that students from low social origin attending high quality schools have higher academic orientation than those from low social origin attending low quality schools (Khader, forth coming). It appears that private schools foster academic achievement especially among minority and lower class students (Greeley, 1982; Benson et al., 1986; Coleman and Hoffer, 1987) and students of private schools are more likely to enroll in post-secondary institutions (Falsey and Heyns, 1984). It appears that private schools provide conditions for need satisfaction (Bhatnagar, 1980) and higher perceived real self concepts among students as compared to public schools (Gupta and Sharma, 1980).

Success of private schools for offering positive educational environments can be identified with their organizational structure (for details see Schneider, 1989). Though student background characteristics are the commonly held explanation about the differences between private and public schools, recent evidences suggest that differences between the two with respect to student background characteristics is considerably less than previously assumed (Williams 1986). Despite the criticism that the private schools are elitists in nature, there are those who strongly defend these schools from the libertarian and religious angle as well as in the name of efficiency and quality and even from the egalitarian perspective (details see Cibulka , 1989).

In the background of these evidences, it is logical for any one to ask the question do private and public schools differ in their effectiveness on school achievement? In otherwords, one should know whether the differences in school achievement are due to school factor or student factor or due to the effect of both. Thus the present study focuses on the differences between private and public schools on their effectiveness on school achievement. Obviously, the study is expected to provide emperical evidences on the differences between private and public schools. It is also expected to suggest an emperical framework to explain school effectiveness as well as the consequences of multiple system of schooling in Indian society from the equity perspective.

METHODOLOGY OF THE STUDY

Research questions

Considering the view that differences between private and public schools can be explained meaningfully from school context perspective, in the initial stage of the study, school context was conceived in-terms of student composition and structural characteristics of schools. But careful examination of the literature and observation of schools suggested modification of the initial conception. The modified conception views school context as the product of school factors, student characteristics and school achievement. The premise is that the context of a school is resultant of the inter-relationships among the critical elements involved in performing its functions and the level of attainment. It means that school factors, student characteristics and the level of school achievement, and the emerging pattern should form the basis to explain the school context. Differences between private and public schools are examined based on this perspective. Thus, the research questions are:

1. Do private and public schools differ by school factors, student characteristics and school achievement?
2. What are the dimensions/factors by which both private and public schools can be differentiated?
3. What are the effects of school factors and student characteristics on school achievement?

Hypotheses

1. There exist significant differences between private and public schools by school factors, student characteristics and school achievement and the differences can be characterised interms of a few dimensions.
2. School factors and student characteristics are significant predictors of school achievement.
3. Combined effect of school factors and student characteristics are greater than each one taken separately.

Method

Sample The study is operationalised based on a sample drawn from Kerala state. Units of observation are both school and student. Using stratified random sampling 10 high schools - 5 private (Christian Missionary) and 5 public (Government) - and 455 class X students were drawn from Calicut District, Kerala State. From the point of view of accessibility, operational effectiveness and similarity of social conditions, the sample was drawn from one district. Schools are stratified as high quality, average quality and low quality levels using pass percentages of schools in the class X board examination held in March, 1990. Though there are public schools with pass percentages below 20%, among private christian missionary schools within the district the lowest level is around 31%. On the other hand, there are private christian missionary schools with 100% pass but none of the public schools within the district indicates the same level of pass. As such schools with pass percentages 40 and below, 41 to 80 and 81 and above are treated as low quality, average quality and high quality schools. Selected schools and the pass percentages are shown in table-2.1. Though the schools are stratified based on 1990 pass percentages, 1991 pass percentages are also shown to identify the consistency of schools with in each stratum.

if the items are negative the scores are reversed. Total score is obtained for each individual. Study behaviour was assessed using study behaviour scale originally devised by Gaff et al.(1973) and reformulated by Khader (1986) (part II, Appendix - D).

- Educational aspiration: indicates the level upto which a student plans his/her studies. The levels are class X, higher secondary/ technical course, graduation, post-graduation/professional course and research studies, and graded from 1 to 5 (part - III, Appendix-D).
- Success - Failure factor: refers to a student's perception of the factor responsible for his or her success or failure in studies. It has two components consisting of success factor and failure factor. Success factor is identified interms of a student's perception of success either due to ability or effort or subject easy. On the other hand, failure is attributed to lack of ability or lack of effort or subject difficulty. A student is expected to choose only one from either success factor or failure factor and the score is '1' (part - IV, Appendix - D).
- Parental concern: refers to a students perception of parents' concern about his or her studies. Responses on a three point scale ranging from 'not at all' to 'to a great extent' for three items are added up to obtain a single score (part-V, Appendix - D).
- Missing class: refers to a student's tendency to miss classes either by deliberately keeping away from classes or by participating in strikes. Frequency of occurrence of such behaviours are treated as scores (part-VI, Appendix - D).
- Socio-Economic status (SES): is a composite score of the education of father and mother, occupation of father and mother and family income. Scores 25 and above are high SES, scores from 15 to 24 are average SES and the scores 14 and below are low SES (part-VII, Appendix - D).
- Nursery education: means whether a student had nursery education prior to entering class - I and scored as '1' or '0' (part-VII, Appendix - D).

Table 2.1 Selected schools and pass percentages

School	Quality level	Code	Pass percentage in SSLC examination	
			1990 March	1991 March
Presentation High School, Calicut	High quality-1	A*	100	100
St.Joseph Boys High School, Calicut	High quality-2	B*	98.9	99.2
Govt. Ganapath Girls High school, Calicut	High quality-3	C**	92.8	91.9
Govt. High School, Puduppady, Calicut (Dist)	High quality-4	D**	83.6	89.9
Govt. Medical College Campus High School, Calicut	Average quality-1	E**	73.5	79.1
St.Joseph High School, Kodencherry Calicut (Dist)	Average quality-2	F*	73.4	67.2
Savio High school Calicut.	Average quality-3	G*	73.7	63.8
Govt. Ganapath Boys High School Calicut	Average quality-4	H**	62.9	58.8
Sacred Heart High School, Thiruvampadi Calicut (Dist)	Low quality-1	I*	31.6	38.6
Govt. Fisheries High School Pudiyappa, Calicut	Low quality-2	J**	19	14.3

* = Private (Christian missionary) schools - A,B,F,G and I

** = Public (government) schools - C,D,E,H and J.

Though schools show improvement and decline in pass percentages when the 1990 base line data are compared with those of 1991, all the schools remain with in the respective stratum. Selected 10 schools consist of 5 private and 5 public schools. Among them, four, two private (A,B) and two public (C,D) are high quality schools and another four, two private (F,G) and two public (E,H) are average quality schools. The remaining two, one private (I) and one public (J) are low quality schools. Within schools, data were obtained from class X students chosen at random. The total sample consisted of 455 students who were appearing for the board examination in March, 1991.

Table 2.2 School wise distribution of sample

	School	Type and level	Code	Sample size
1.	Presentation H.S.	Private high quality	A	51
2.	St.Joseph B.H.S.	Private high quality	B	39
3.	Govt.Ganapath G.H.S.	Public high quality	C	46
4.	Govt.H.S.Puduppady	Public high quality	D	49
5.	Govt. Medical College Campus H.S.	Public average quality	E	47
6.	St.Joseph H S	Private average quality	F	37
7.	Savio H.S.	Private average quality	G	47
8.	Govt. Ganapath B.H.S.	Public average quality	H	44
9.	Sacred Heart H.S.	Private low quality	I	45
10.	Govt. Fisheries H.S.	Public low quality	J	50
		Total sample		= 455

Variables

Data are obtained on school and student related variables.

School factor variables

- Type of school: consists of private school and public schools. Private school refers to christian missionary school and public school is one which is owned and operated by the state government of Kerala. In short, public school means government school.

- Level of selectivity: refers to the admission policy pursued by schools for enrolling students. Data was obtained from the headmaster/head mistress of the concerned school on single item on four point scale ranging from not at all selective (0) to highly selective (3) (Appendix-B).

- Management: refers to school management identified in terms of two variables - management control and management facility. Management control refers to control on the performance of staff and role expectations. Teachers' responses on a three point scale - once in a while, frequently, regularly or low, moderate, high - ranging from 1 to 3 were obtained. A composite score of 4 items was obtained (Appendix - A). Management facility implies the level of facilities provided by the authorities interms of library, laboratory and co-curricular activities. Data on management facility were obtained from teachers and head masters or head mistresses on 4 items on a three point scale, low (1), moderate (2) and high (3). A composite score was derived to indicate management facility (Appendix - A & B).

- Teacher component: includes number of teachers, teacher-student ratio and work ethics. Data on the strength of teachers and size of students were obtained from each school (Appendix-B) and the teacher-student ratio was calculated. Work ethics is identified as hard work involving planning of work in advance, effort, systematic completion of work and adherence to rules. A composite score was obtained based on the responses of teachers on three point scale for 4 items and on four point scale for two items (Appendix - A).

School size: refers to the total students attending the school (Appendix - B).

- Fees per pupil : refers to fees charged by school per pupil annually and the data was obtained from the head master/head mistress of the school (Appendix - B).

- School expenditure: refers to the total expenditure incurred by each school during one academic year - 1990-1991. The figure was obtained from the head master/head mistress of the school (Appendix-B).

- Overall quality: means the overall quality of a school perceived by the teachers and head master or head mistress of that school. It is a single item score ranging from low (1) to high (3) (Appendix - A & B).

- School environment: means the environment perceived by students interms of six components - academic emphasis, involvement, teacher-student relationship, facilities, discipline and overall quality. Component scores and total score were obtained for eadh student using Khader's school environment scale (Appendix - C).

Student characteristics

- Intelligence: is estimated by students' scores in Raven's standard progressive matrices.

- Achievement value: refers to a strong desire of an individual to compete a task successfully with a standard of excellence. It also refers to a keen interest in undertaking difficult and challenging tasks and a strong sense of optimism. Achievement value is assessed using 15 items from Mukherjee's sentence completion test. Each statement consists of forced choice triads. Every correct response is awarded a score of '1' and the summated score indicates the level of achievement value (part-1, Appendix - D).

- Study behaviour: refers to students' study behaviours interms of organizing subject matter, reformulation of subject matter, concentration on required subject matter, review, organization of time, continuity of study, regular class attendance and note taking. There are 24 items and each has three responses - always, sometimes and rarely. Scores are in the order of 3,2,1 for positive statements.

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- Nursery education: means whether a student had nursery education prior to entering class - I and scored as '1' or '0' (part-VII, Appendix - D).

- Language proficiency: means proficiency in mother tongue (malayalam) and is identified as lower level, higher level and linguistic level. Lower level indicates the proficiency to comprehend facts or ideas presented in mother tongue while higher level means the proficiency to analyse, to infer and to critically examine the ideas presented in mother tongue. Linguistic level implies the proficiency in the proper understanding of common and figurative usage of language. Language proficiency was assessed using a structured but unlearned passage with two sets (A and B) of questions. First, 3 questions in the set-A deal with lower level language proficiency. Each correct response was given '1' score and the summated score indicates lower level. Next, 3 questions in set A deal with higher level language proficiency. Correct response to the first question was given '1' score and for the remaining two questions, possible correct responses were given '2' each, and the summated score indicates higher level. Responses to 4 questions in the set-B were combined to form linguistic level. Correct responses to the first three questions were given a score of '1' each and the score was '2' for the possible correct responses to the fourth question. The test was developed with the help of an expert in malayalam language teaching and tried out before use (Appendix - E).

- Science achievement: refers to student's cognitive level of attainment in science and categorised as level-I and level-II. Level-I consists of knowledge and understanding in science. Level-II refers to the ability to analyse and to apply principles or ideas in science. A science achievement test based on the unit on magnetism consisting of 8 items was used to assess Level-I and level-II. A score of '1' was given to each correct response to the first 5 items and the summated score indicates Level-I. Level-II was identified using the last three items. Correct response to the middle question was given a score of '1' and for the remaining two questions, correct responses were given '2' each, and the summated score indicates level-II. The test was developed with the help of an expert in science teaching and tried out before use (Appendix - F).

- School achievement: refers to overall academic achievement in class X. This was identified interms of percentage of marks obtained in class X board examination held in March, 1991. Percentage of marks for 455 students drawn from the selected sample of 10 schools were obtained from the respective schools in June-July, 1991.

Malayalam versions of the tools - appendix-C, D & F - were used to obtain the concerned data from students where ever needed.

Analysis

When an individual performs an action or set of actions in an institutional setting multiple attributes, individual as well as institutional, operate simultaneously. If such attributes are considered together it may provide a meaningful explanation of the phenomenon under investigation. Based on this premise multivariate analysis techniques are used to analyse the data obtained from 10 schools and 455 students.

Multivariate technique of principal components analysis is used to analyse the data on school factor variables obtained from teachers and headmasters. Multivariate analysis of variance and cononical discriminant analysis are used to analyse the data obtained from students forming several groups. Finally, multiple regression is used to predict school achievement based on important variables from school factors and student characteristics. The results of multivariate techniques are used to screen out those variables which are not found to be important and the identified set of variables served as the basis for multiple regression.

RESULTS

Section 1

Principal components analysis is done to characterize private and public schools and to identify the differences existing among them based on the data on school factor variables obtained from teachers and headmasters. The variables consist of level of selectivity, management-control, management-facility, teacher-student ratio, work ethics, school size, fees per pupil, school expenditure and overall quality. Data on school environment variables obtained from students are treated along with student data.

Table 3.1 Means and correlations

Variables	Mean	Cumulative variation %	1	2	3	4	5	6	7	8	9
1. Level of selectivity	0.6	140	-								
2. Management control	3.6	29	.54	-							
3. Management facility	1.7	48	.77	.35	-						
4. Teacher-student ratio	33.0	13	-.12	.40	.03	-					
5. Work ethics	11.7	25	.57	.93	.37	.31	-				
6. School size	1301.7	34	.09	.05	.19	.75	-.09	-			
7. Fees per pupil	15.6	102	.61	.56	.49	.00	.58	.02	-		
8. School expenditure	200.2	25	.25	.66	.47	.43	.58	.19	.51	-	
9. Overall quality	2.6	41	.66	.81	.35	.42	.82	.28	.56	.39	-

Table 3.1 indicates that maximum variation among schools is due to level of selectivity followed by fees per pupil, management-facility, overall quality of school and school size. These five, among the nine variables, emerge as the most potential variables which have the power to differentiate the schools effectively. The remaining variables are

is a powerful in explaining the variation. Results further suggest that level of selectivity has higher correlation with management-facility, fees per pupil and overall quality. Similar trend in correlations is observed for management control with work ethics, school expenditure and overall quality. Higher correlations between teacher-student ratio and school size, and work ethics and overall quality are also indicated.

Table 3.2 Eigenvalues and related statistics

Root	Eigen values	Trace%	Cumulative %	d f	Chi-square
1	4.56	50.66	50.66	36	82.09
2	1.82	20.28	70.94	28	57.13
3	1.14	12.66	83.60	21	42.61
4	0.77	8.59	92.19	15	30.79
5	0.45	5.01	97.19	10	20.18

Results in table 3.2 reveal that the eigenvalues of first three factors are 4.56, 1.82 and 1.14 respectively. The first factor/root explains 50.66% of the total variance. While the variance due to second factor is 20.28%, the third factor accounts for 12.66% of variance. Thus, the first three factors together, based on nine variables account for 83.6% of variance among schools. The remaining two factors are found to be less important in explaining the variance.

Table 3.3 Factor pattern

Variables	I	II	III
1. Level of selectivity	.74	-.41	-.41
2. Management-control	.90	.02	.37
3. Management-facility	.64	-.24	-.62
4. Teacher-student ratio	.39	.90	.07
5. Work ethics	.88	-.10	.40
6. School size	.24	.80	-.51
7. Fees per pupil	.74	-.31	-.09
8. School expenditure	.71	.19	.11
9. Overall quality	.87	.09	.12

Table 3.3 shows that the first factor is loaded positively by level of selectivity, management-control, work ethics, fees per pupil, school expenditure and overall quality. The highest contribution is made by management-control (.90), followed by work ethics (.88), overall quality (.87), level of selectivity and fees per pupil (.74 each) and school expenditure (.71). Since level of selectivity of school, fees charged on pupil, expenditure incurred by school, work ethics of teachers and control on the staff substantially reflect the management policy of schools, the first factor is termed as management system.

The second factor is positively loaded by teacher-student ratio (.90) and school size (.30). Since teacher-student ratio and school size are highly related and the factor can be more meaningfully explained interms of teacher-student ratio, the second factor is identified as teacher-student ratio.

The negative side of third factor is loaded by management-facility (-.[illegible]), school size (-.51), and level of selectivity (-.41). Management-facility has the highest factor loading and highly correlated with level of selectivity. Since facilities available to students have greater academic significance, the negative side of third factor is called school facility. However, the positive side of third factor is loaded by work ethics and management control. Between the two, work ethics has the highest factor loading. Both are highly correlated in the sense that schools where management-control is effective teachers may follow work ethics. But the teachers who are conscious of their duty may perform their work irrespective of the nature of prevailing control system. Since work ethics perspective provides a meaningful interpretation, the positive side of third factor is termed as work ethics.

First factor has the highest differentiating power and school groups substancially differ on this. Subsequent factors reflect lower and lower magnitude of information.

Factor pattern plots are shown for principal components I & II, I & III and II & III separately and the attributes are shown as vectors originating from the origin. They are shown on figures 3.3a, 3.3b and 3.3c respectively.

Table 3.4 Standardised scores in PCA space

Presentation H S (Private high)	A	1.93	-1.05	-0.45
St. Joseph H S (")	B	1.33	0.32	-0.31
Govt. Ganapath G H S (Public High)	C	0.49	0.70	1.74
Govt. H S Puduppady (Public High)	D	-0.02	-0.23	1.84
Govt. Medical College Campus H S (Public average)	E	-0.20	2.17	-0.51
St. Joseph H S (Private average)	F	-0.67	-1.19	0.04
Savio H S (Private average)	G	-0.19	-0.49	-0.64
Govt. Ganapath B H S (Public average)	H	-0.38	0.68	-0.69
Sacred Heart H S (Private low)	I	-1.08	-0.40	0.21
Govt. Fisheries H S (Public low)	J	-1.21	-0.51	-0.74

Projection of schools on the plane of principal components I and II, I and III, and II and III are represented in the figures 3.4a, 3.4b and 3.4c. The figure 3.4a shows larger differences among schools on the plane of management system and teacher-student ratio. Private high quality schools, A and B are located far away from other schools on the axis of management system and suggest that both have effective system of management. When locations of schools, A and B are related to vector positions in figure 3.3a, it indicates that the effective management system of school A reflects its policy on level of selectivity and fees per pupil. It is the only school among the 10 which is highly selective and charges higher fees. The effective management system in school B can be linked to its management-control and overall quality. Location of public high quality school, C indicates moderately effective management system. Though schools, D-public high quality, E and H-public average quality, and G-private average quality are located close by on the axis of management system suggesting average level of management, school D is relatively better among them. However, private average quality school-F is relatively weak in management system. Certainly, both private-I and public-J low quality schools depict highly weak management systems.

On teacher-student ratio though schools A,D,F,G I and J maintain low levels, schools A and F stand apart from the rest suggesting

Fig 3.3a: Factor Pattern Plots for Principal Components I & II

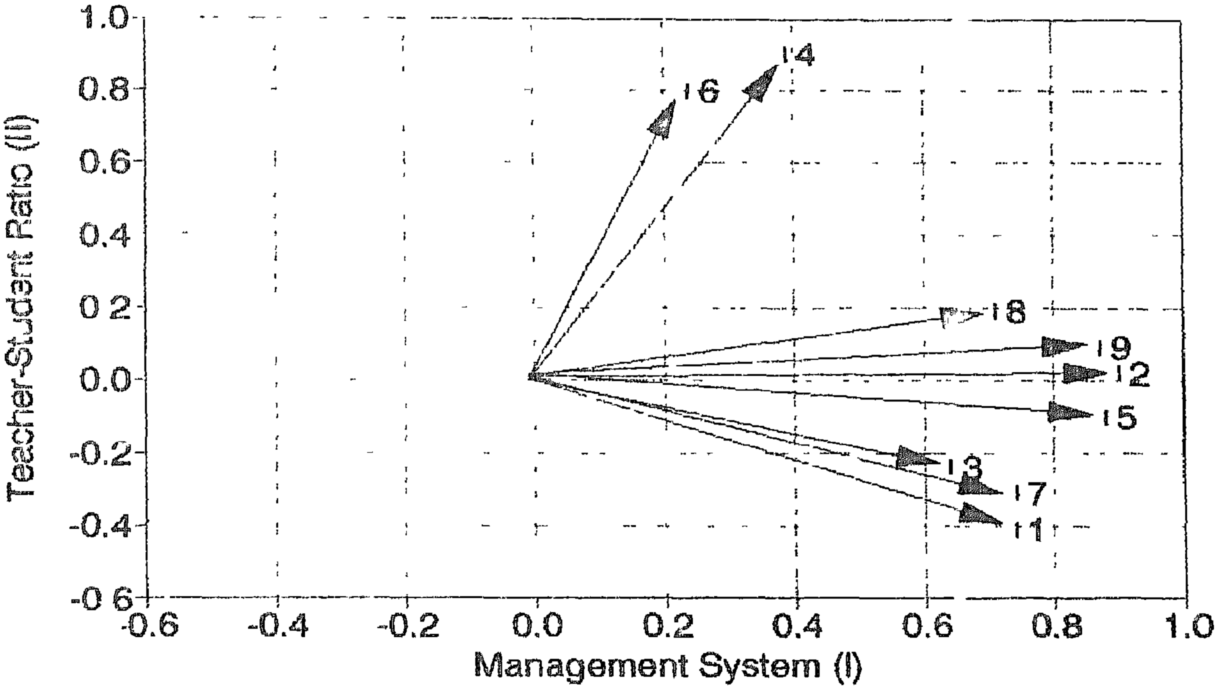


Fig 3.4a: Projection of Schools on the plane of Principal Components I & II

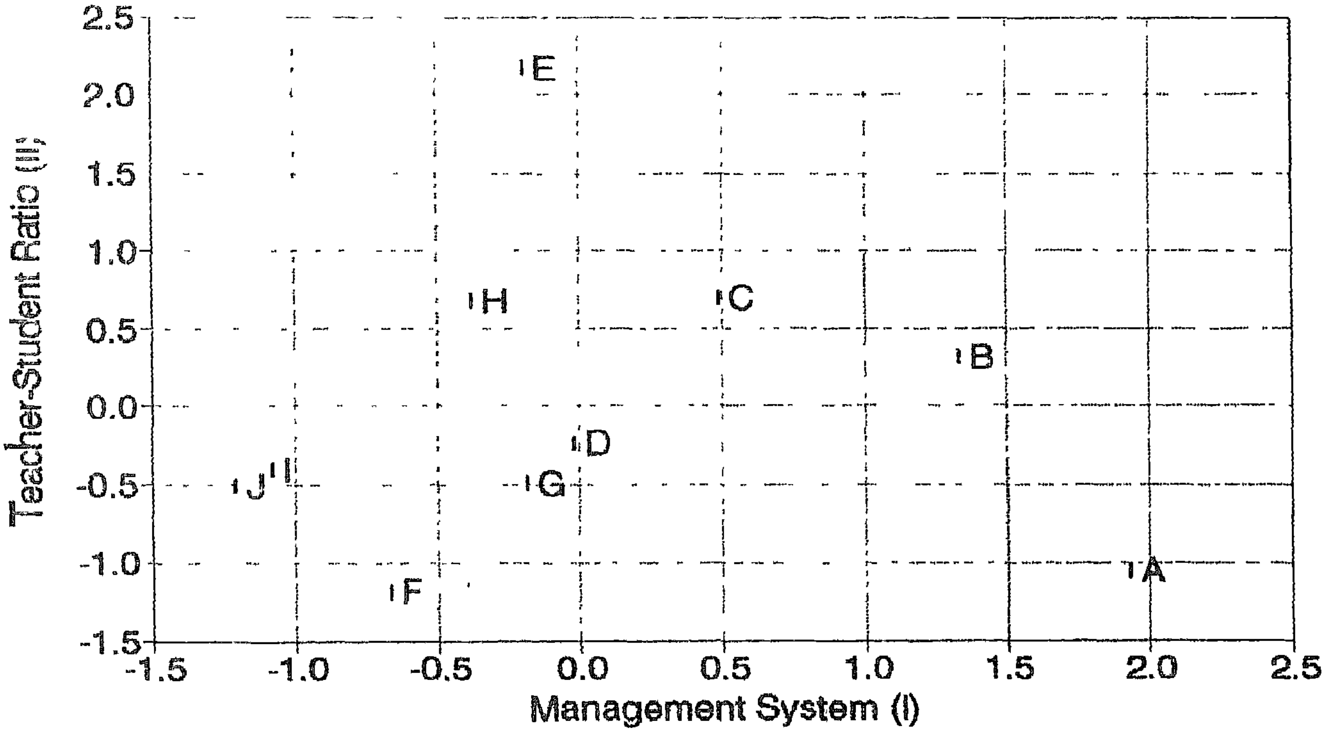


Table 3.5 Grouping Pattern of the Sample

Type of School	Quality level of School	School Code	SES level	Sex	Sample Size	Group Code	Total School Sample
Private	High	A	SES-H	F	38	1	51
"	"	"	SES-A	F	13	2	
Private	High	B	SES-H	M	26	3	39
"	"	"	SES-A	M	13	4	
Public	High	C	SES-H	F	17	5	46
"	"	"	SES-A	F	22	6	
"	"	"	SES-L	F	07	7	
Public	High	D	SES-A	M	10	8	49
"	"	"	SES-L	M	26	9	
"	"	"	SES-A	F	03	10	
"	"	"	SES-L	F	10	11	
Public	Average	E	SES-A	M	09	12	47
"	"	"	SES-L	M	16	13	
"	"	"	SES-H	F	03	14	
"	"	"	SES-A	F	11	15	
"	"	"	SES-L	F	08	16	
Private	Average	F	SES-A	M	04	17	37
"	"	"	SES-L	M	09	18	
"	"	"	SES-A	F	21	19	
"	"	"	SES-L	F	03	20	
Private	Average	G	SES-A	M	15	21	47
"	"	"	SES-L	M	06	22	
"	"	"	SES-A	F	17	23	
"	"	"	SES-L	F	09	24	
Public	Average	H	SES-H	M	09	25	44
"	"	"	SES-A	M	29	26	
"	"	"	SES-L	M	06	27	
Private	Low	I	SES-A	M	03	28	45
"	"	"	SES-L	M	18	29	
"	"	"	SES-A	F	05	30	
"	"	"	SES-L	F	19	31	
Public	Low	J	SES-L	M	23	32	50
"	"	"	SES-L	F	27	33	

Schools = 10, Groups = 33, Total Sample = 455

ideal form of teacher student ratio. But locations of schools B, C, D and E indicate higher ratio and among them school E maintains an extremely higher teacher student ratio.

The emerging pattern suggests that though private high quality schools, A and B have effective management systems, school, B has higher teacher-student ratio than school A. Despite relatively low teacher-student ratio low quality schools whether private or public, have highly weak management systems. Though schools, C-high quality public and H-average quality public have same level of teacher-student ratio what makes them differ is the management system where C has moderately effective management system while in H, the management system is at the average level. Public high quality school, D and private average quality school, G are similar in the sense that both have low teacher-student ratio and maintain average level of management systems. Private average quality school, F has a relatively weak management system even with the advantage of low teacher-student ratio, while public average quality school, E with average level of management is able to maintain a considerably higher-teacher student ratio.

Thus the results indicate that among private schools, only high quality schools maintain effective management systems and low quality schools depict extremely weak management systems. The rest of the private schools show average level of management systems. Among public schools, with the exception of one high quality school, C where the management system is moderately effective, the rest of the schools are either average or weak in management systems. In general, teacher-student ratio is relatively high in public schools as compared to private schools.

Figure 3.4b depicts the location of schools on the plane of management system and school facility-work ethics. The figure indicates that both private high quality schools, A and B, are quite distinct from other schools in the sense that they have highly effective management systems and adequate school facilities. It is striking to note that though public high quality schools, C and D differ on management systems, they follow substantially higher work ethics than the rest of the schools. But they do not indicate having adequate facilities.

Fig 3.3b: Factor Pattern Plots for Principal Components I & III

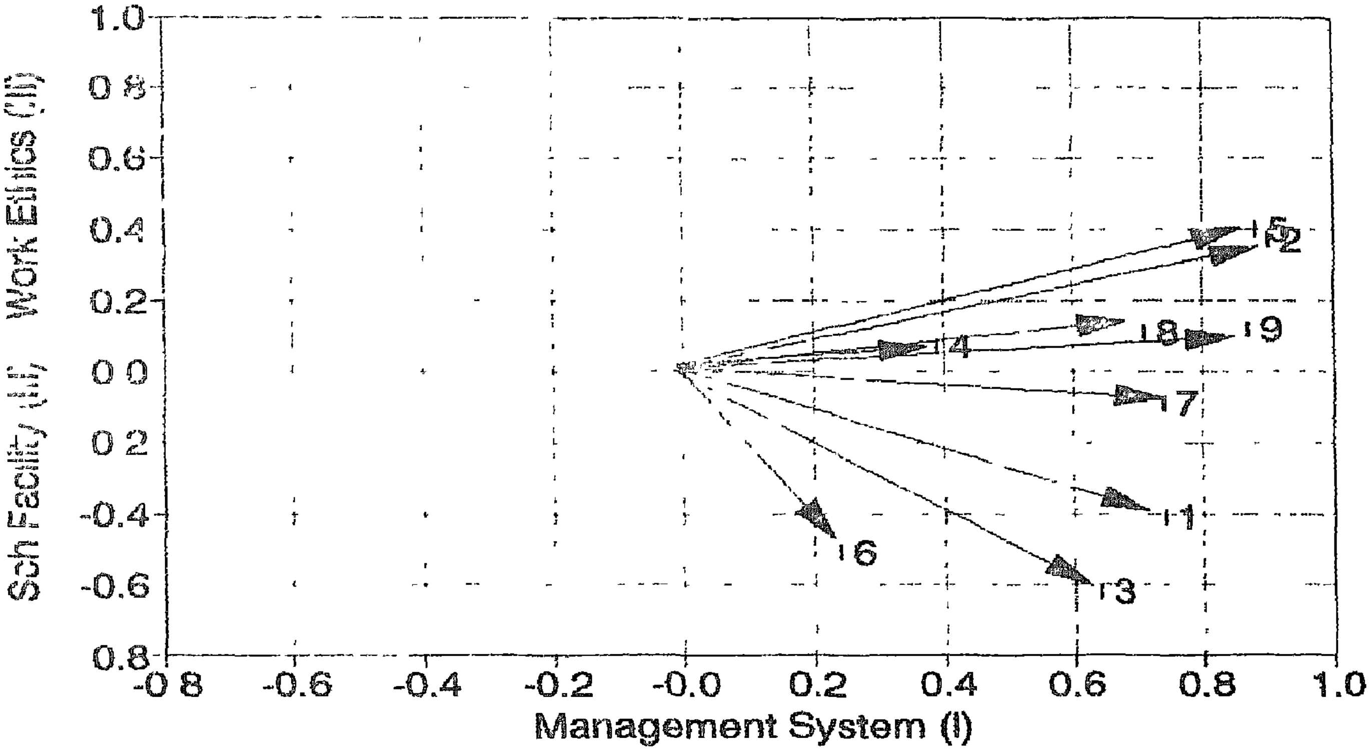
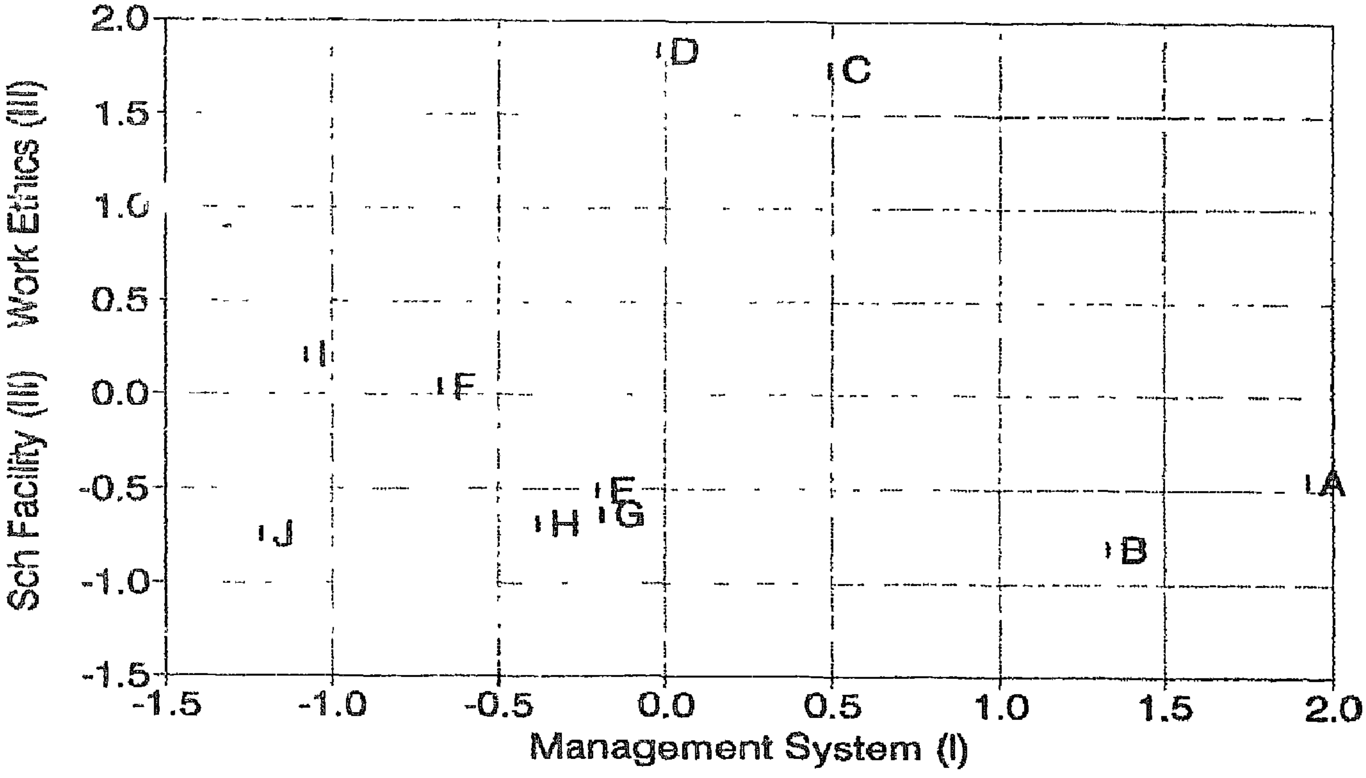


Fig 3.4b: Projection of Schools on the plane of Principal Components I & III



public average quality schools, E and H and private average quality school G are similar in the sense that though they all have adequate facilities, the prevailing management systems are at the average level. However, private average quality school, F gives importance to work ethics despite its weak management system. Notwithstanding, their equally weak management systems, low quality private, I and public, J schools differ on facility and work ethics. While low quality public school, J has adequate facility, low quality private school, I gives importance to work ethics. In otherwords, school J does not give importance to work ethics and school, I lacks adequate facilities.

The emerging trend suggests that schools considerably differ on work ethics. Considerably higher work ethics exists in public high quality schools, C and D. Private average quality, F and low quality, I schools too show work ethics. These four schools give importance to work ethics despite low facilities. On the otherhand, the rest of the schools whether private high quality or average quality and public average quality or low quality have adequate facilities but there is a need to give importance to work ethics

The figure 3.4c represents schools on the plane of teacher-student ratio and school facility-work ethics. Both public high quality schools C and D indicate higher work ethics but school, C has higher teacher-student ratio than school, D. Private average quality school, F and private low quality school, I have the advantage of low teacher-student ratio and show work ethics. Though schools, A,G,J,B,H and E all indicate adequate facilities, they differ considerably on teacher-student ratio. Among them school, E has the highest teacher-student ratio while B and H are relatively high. Teacher-student ratio is certainly low in schools A, G and J. It is interesting to note that though both low quality schools have low teacher-student ratio only private low quality school, I gives importance to work ethics. On the otherhand public low quality school, J despite having low teacher-student ratio and adequate facilities does not give any importance to work ethics.

The analyses of school variables so far indicate that private schools, A and B maintain their high quality in terms of effective management systems and adequate facilities. School-B, of course, has

Fig 3.3c: Factor Pattern Plots for Principal Components II & III

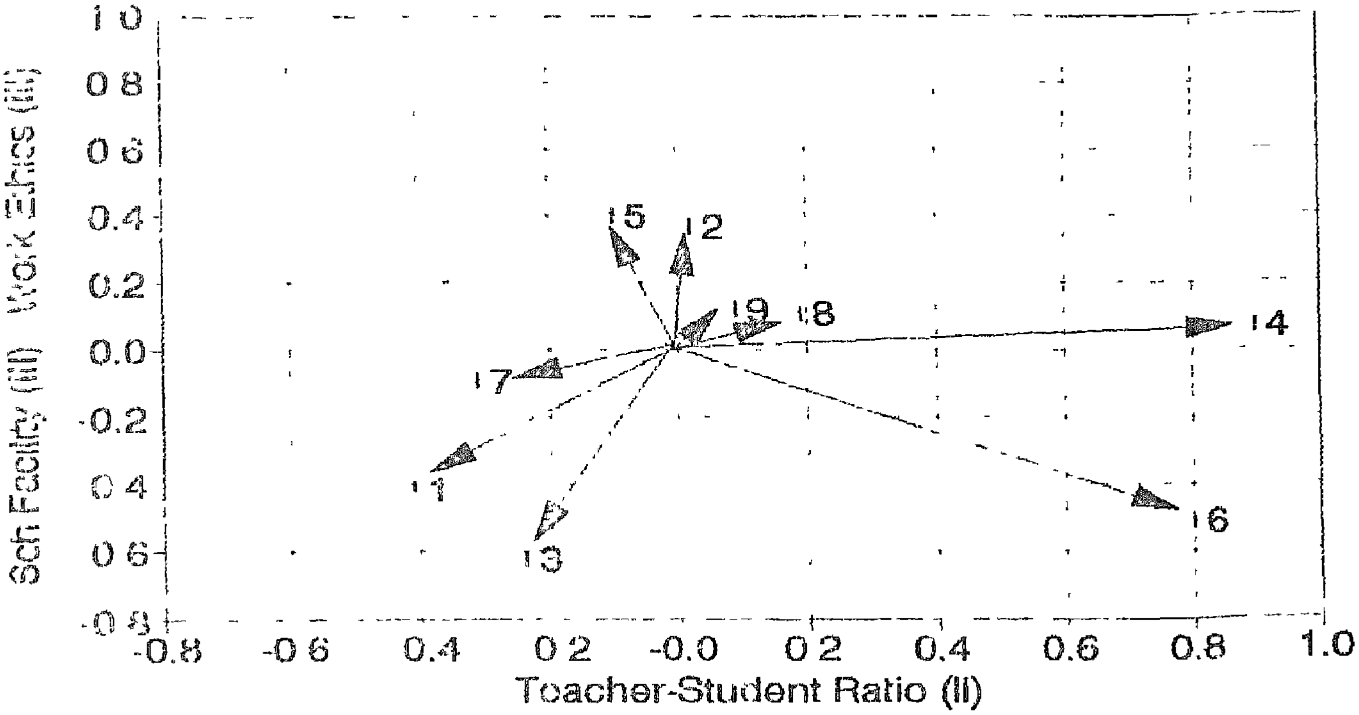
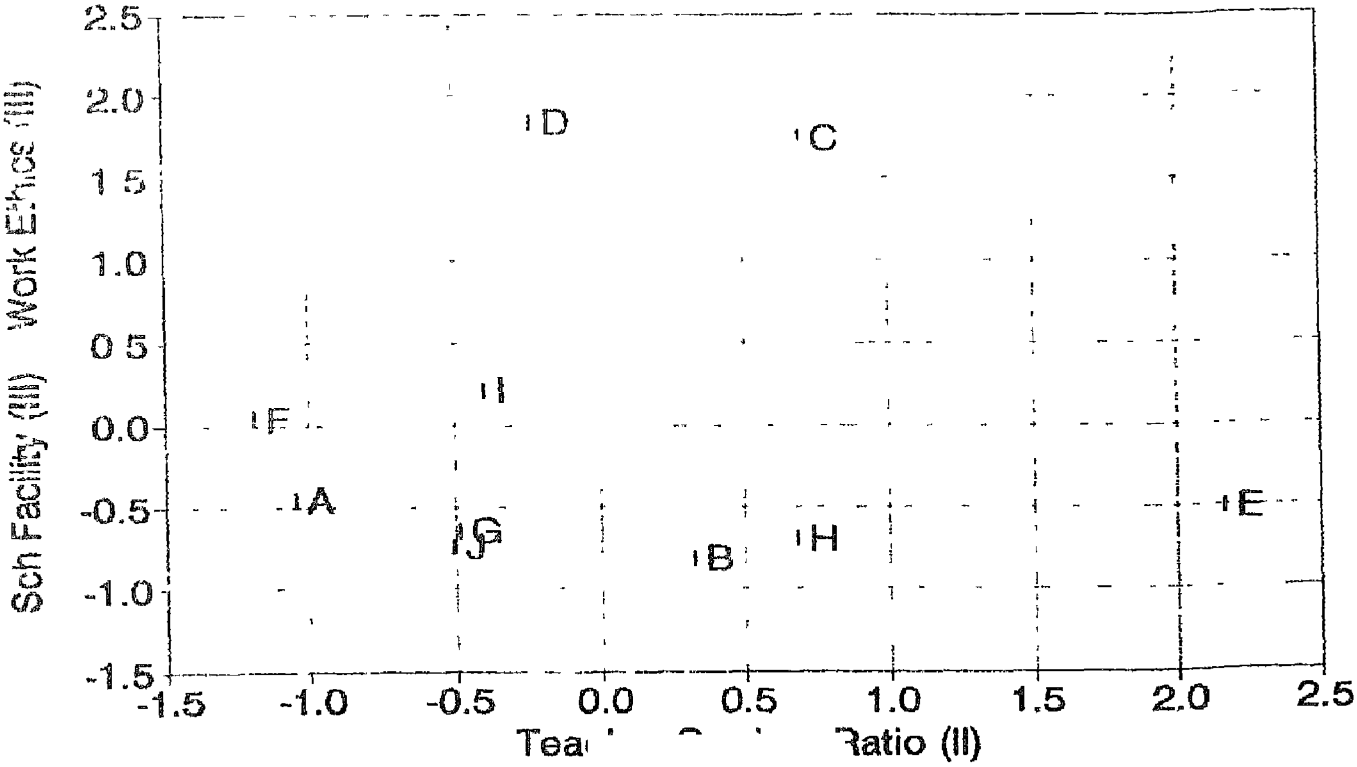


Fig 3.4c: Projection of Schools on the plane of Principal Components II & III



relatively more teacher-student ratio than school A. Though the management systems in public high quality schools are not so effective as those of the private high quality, they are oriented considerably towards work ethics. Low quality schools either, private or public are weak in management systems. The management systems are either average or weak in both private and public average level schools. In general, the teacher-student ratio is relatively high in public schools and it is rather low in private schools and this reflects the differences in the enrolment policy adopted by the private and public schools. Schools with limited facilities give importance to work ethics.

Section II

Multivariate analysis of variance and canonical discriminant analysis of data obtained from students on school environment perceived by students, student factor variables and school achievement are done to identity further evidences on the differences between private and public schools. The rationale is that no single variable will be effective in discriminating the groups but by combining them mathematically, it is possible to find the functions on which the groups differ. The derived functions can be thought of as the axes of a geometric space and can be used to study the spatial relationships among the groups (Klecka, 1975).

Groups are created using the criteria-type of school, quality level of school, SES level and sex. Schools are initially grouped as private and public and with in each type schools are grouped as high, average and low quality levels. Each quality level is further grouped as SES high, average and low, and with in each SES group, male and female groups are created as shown in table 3.5.

Data in table 3.5 indicate that private high quality schools, A and B, are invariably peopled by students from high and average social origins. In other words private high quality schools are predominantly peopled by students from higher social origin. On the otherhand, public high quality schools, C and D, are peopled by students from haterogeneous social origins ranging from low to high but the dominant groups are those from low or average social origins. Both private and public average quality schools are predominantly attended by students from average or low social origins. Those from higher social origins attending such schools are negligible in size. It is not surprising to find large concentration of students from low social origins in low quality schools whether private or public.

Table 3.5 Grouping Pattern of the Sample

Type of School	Quality level of School	School Code	SES level	Sex	Sample Size	Group Code	Total School Sample
Private	High	A	SES-H	F	38	1	51
"	"	"	SES-A	F	13	2	
Private	High	B	SES-H	M	26	3	39
"	"	"	SES-A	M	13	4	
Public	High	C	SES-H	F	17	5	46
"	"	"	SES-A	F	22	6	
"	"	"	SES-L	F	07	7	
Public	High	D	SES-A	M	10	8	49
"	"	"	SES-L	M	26	9	
"	"	"	SES-A	F	03	10	
"	"	"	SES-L	F	10	11	
Public	Average	E	SES-A	M	09	12	47
"	"	"	SES-L	M	16	13	
"	"	"	SES-H	F	03	14	
"	"	"	SES-A	F	11	15	
"	"	"	SES-L	F	08	16	
Private	Average	F	SES-A	M	04	17	37
"	"	"	SES-L	M	09	18	
"	"	"	SES-A	F	21	19	
"	"	"	SES-L	F	03	20	
Private	Average	G	SES-A	M	15	21	47
"	"	"	SES-L	M	06	22	
"	"	"	SES-A	F	17	23	
"	"	"	SES-L	F	09	24	
Public	Average	H	SES-H	M	09	25	44
"	"	"	SES-A	M	29	26	
"	"	"	SES-L	M	06	27	
Private	Low	I	SES-A	M	03	28	45
"	"	"	SES-L	M	18	29	
"	"	"	SES-A	F	05	30	
"	"	"	SES-L	F	19	31	
Public	Low	J	SES-L	M	23	32	50
"	"	"	SES-L	F	27	33	

Schools = 10, Groups = 33, Total Sample = 455

Group and total means are given in table 3.6. Table 3.7 indicates among group correlations. Achievement value shows higher correlations with educational aspiration, intelligence, science achievement level II, nursery education and school achievement. Study behaviour has higher positive relationship with academic emphasis, involvement, overall quality, school environment, language proficiency - higher level and linguistic level, science achievement - level I and level II, nursery education and school achievement, while it has higher negative relationship with failure - lack of effort. Educational aspiration shows higher positive correlations with facility, success - subject easy, language proficiency-higher level, science achievement - level I and level II, nursery education and school achievement. But it has higher negative relationship with failure - lack of effort. Among school environment components, academic emphasis has higher positive correlations with involvement, overall quality, school environment, language proficiency - linguistic level, science achievement - level I and level II, and school achievement. But it shows higher negative correlations with failure - lack of effort. Involvement shows higher correlations with overall quality and school environment, language proficiency - higher level and linguistic level, science achievement-level I and level II, and school achievement. Facility has higher correlations with discipline, school environment, language proficiency - higher level, science achievement - level II, nursery education and school achievement. Overall quality has higher correlations with school environment, language proficiency-higher level and linguistic level, science achievement level I and level II, and school achievement. School environment indicates higher correlations with language proficiency - higher level and linguistic level, science achievement - level I and level II and school achievement. However, missing class has higher positive correlation with success-ability and higher negative correlation with language proficiency-lower level.

Success - ability has higher correlation with intelligence. Success-effort has higher negative relations with failure - lack of effort and subject difficulty. Success-subject easy shows higher negative correlation with failure - lack of effort. Failure-lack of effort has higher negative correlations with science achievement-level I and school achievement. Intelligence has higher correlations with science achievement-level I and level II, nursery education and

school achievement. Language proficiency - higher level has higher correlations with linguistic level, science achievement - level I and level II, nursery education and school achievement. Language profeciency - linguistic level has higher relationships with science achievement-

Table 3.6-Group and total means for 33 groups

Group \ Variables N		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	38	6.3	52.7	4.0	7.8	11.7	10.3	6.9	7.1	7.9	7.7	51.0	0.7	0.2	0.4	0.2	0.0	0.1
2	13	6.0	52.8	3.5	7.8	12.3	10.1	6.8	7.0	7.9	7.5	51.3	1.4	0.1	0.2	0.0	0.0	0.3
3	26	6.8	54.9	3.8	7.6	12.2	9.5	7.3	7.0	6.9	7.2	50.1	2.0	0.2	0.6	0.1	0.0	0.2
4	13	7.2	55.5	3.4	7.2	10.8	9.2	7.2	7.2	11.5	7.0	48.4	1.5	0.0	0.7	0.1	0.0	0.2
5	17	6.1	54.3	3.6	7.8	10.6	8.6	5.9	6.2	7.1	6.9	45.8	[illegible]	0.2	0.4	0.4	0.0	0.1
6	22	5.4	55.2	3.5	7.7	12.5	9.7	6.8	6.4	7.9	7.0	50.5	1.8	0.1	0.5	0.2	0.0	0.0
7	7	5.3	53.4	3.1	8.0	11.9	9.9	7.0	5.7	7.3	7.0	43.7	3.4	0.0	0.3	0.3	0.0	0.0
8	10	5.7	54.3	2.7	7.3	12.8	9.8	8.3	5.3	7.3	7.9	52.0	0.2	0.1	0.9	0.0	0.0	0.1
9	26	4.2	54.3	3.0	7.3	12.3	10.3	8.2	4.8	.6	8.4	51.7	0.7	0.0	0.7	0.0	0.1	0.1
10	3	5.0	52.3	2.0	6.7	10.3	9.7	8.0	4.3	6.7	8.3	47.0	0.0	0.0	0.7	0.0	0.0	0.3
11	10	5.6	58.2	2.9	8.3	12.8	10.4	8.0	5.5	7.6	8.1	52.5	0.0	0.0	0.9	0.0	0.0	0.0
12	9	3.7	55.9	2.3	8.1	10.9	9.6	8.2	6.0	7.5	7.4	50.1	0.3	0.0	0.3	0.0	0.1	0.3
13	16	3.6	48.9	2.3	7.9	9.2	8.9	7.4	5.2	6.1	[illegible]	41.1	1.9	0.2	0.2	0.0	0.0	0.5
14	3	4.3	58.0	4.0	8.7	10.0	10.7	7.0	6.3	[illegible]	7.7	47.3	0.0	0.3	0.3	0.0	0.0	0.3
15	11	5.1	49.0	2.4	7.8	10.0	9.0	6.4	5.4	6.5	7.5	44.5	0.4	0.0	0.1	0.0	0.0	0.5
16	8	4.1	51.0	2.3	7.5	11.8	9.8	7.6	6.3	6.9	6.5	48.8	0.0	0.0	0.3	0.0	0.0	0.3
17	4	2.5	55.8	3.3	8.0	12.8	10.5	8.3	7.5	8.0	5.8	53.5	0.0	0.0	0.3	0.3	0.0	0.5
18	9	4.3	48.4	2.4	7.4	9.7	9.0	5.9	6.2	7.6	6.2	44.8	0.6	0.0	0.3	0.0	0.0	0.7
19	21	3.3	49.5	2.7	8.2	10.4	9.9	8.0	6.1	7.6	6.2	47.9	0.2	0.0	0.4	0.1	0.0	0.4
20	3	3.0	46.3	2.7	8.0	9.3	9.0	7.7	6.0	7.3	6.7	46.0	0.0	0.0	0.0	0.0	0.0	1.0
21	15	4.9	52.5	2.6	7.8	10.9	9.5	7.7	6.1	8.1	6.3	48.7	0.0	0.0	0.6	0.0	0.0	0.3
22	6	3.7	56.7	2.3	7.8	11.7	10.0	8.3	6.5	7.8	6.5	51.2	0.0	0.0	0.7	0.0	0.0	0.3
23	17	4.4	51.6	2.8	7.8	11.8	9.6	7.4	6.4	7.7	6.4	49.4	0.0	0.0	0.2	0.0	0.0	0.6
24	9	4.9	50.0	2.9	7.4	12.3	10.6	7.7	6.1	7.9	7.2	51.8	0.0	0.0	0.0	0.0	0.0	0.6
25	9	6.3	53.3	2.9	7.9	10.7	8.8	7.7	5.3	5.8	5.2	43.0	2.6	0.1	0.3	0.3	0.0	0.1
26	29	5.1	49.3	2.8	7.5	10.6	9.0	7.2	5.5	6.3	6.2	44.9	3.4	0.2	0.3	0.0	0.0	0.4
27	6	6.2	50.8	2.7	6.5	12.0	9.8	7.8	5.3	7.2	5.8	47.2	7.5	0.2	0.0	0.2	0.2	0.5
28	3	3.7	54.3	3.7	9.0	12.3	10.3	7.7	6.7	8.3	4.7	50.0	0.0	0.3	0.7	0.0	0.0	0.0
29	18	3.9	44.4	2.2	7.2	10.1	8.9	7.3	5.4	7.1	4.4	43.3	0.4	0.0	0.1	0.0	0.0	0.4
30	5	5.4	47.0	3.4	7.0	10.4	8.8	7.4	5.6	7.0	4.6	43.8	0.0	0.0	0.4	0.0	0.0	0.4
31	19	4.2	43.9	2.7	7.2	9.5	8.4	7.6	5.8	6.2	4.5	41.9	0.4	0.1	0.4	0.1	0.1	0.2
32	23	4.8	41.8	2.7	7.3	8.9	8.1	6.9	4.7	6.7	4.1	39.4	0.4	0.1	0.1	0.0	0.0	0.7
33	27	4.6	42.1	2.9	7.6	9.3	8.5	7.3	5.0	6.9	4.5	41.7	0.1	0.0	0.6	0.0	0.1	0.3
	455	5.0	50.7	3.0	7.6	11.0	9.4	7.4	5.9	7.3	6.5	47.4	1.1	0.1	0.4	0.1	0.0	0.3

Variables
1. Achievement value
2. Study behaviour
3. Educational aspiration
4. Parental concern

School environment:
5 - academic emphasis
6 - involvement
7 - teacher student relationship
8 - facilities
9 - discipline
10 - overall quality
11 - school environment (total)

12. Missing class

Success:
13 - ability
14 - effort
15 - subject easy

Failure:
16 - lack of ability
17 - lack of effort
18 - subject difficul

19. Intelligence

Language proficiency:
20. lower level
21. higher level
22. linguistic level

school achievement. Language proficiency - higher level has higher corelations with linguistic level, science achievement - level I and level II, nursery education and school achievement. Language profeciency - linguistic level has higher relationships with science achieve-

Table 3.7 Among group correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	1
1. Achievement value	1.00	.40	.70	-.11	.38	09	-.40	.45	.30	.31	.26	.42	.38	.21	.43	-.25	-.46	-.
2 Study behaviour		1.00	.46	.40	.81	.71	.21	.53	.44	.81	.87	.20	.09	.46	.37	-.19	-.54	-.
3. Educational aspiration			1.00	25	.48	.39	-.31	.67	.32	.37	.47	.20	46	.25	.60	-.20	-.58	-.
4. Parental concern				1.00	.21	.42	.02	.37	.04	.29	.36	-.21	.08	.14	.26	-.42	-.19	-.
School environment'																		
5. academic emphasis					1.00	.81	.25	.49	.38	.68	92	10	-.02	.39	.25	-.09	-.52	.
6. involvement						1.00	.30	.47	.47	.75	.92	-.22	-.12	.32	.17	-.14	-.40	.
7 teacher-student relationship							1.00	-.05	.03	13	.29	-.20	-.29	.43	-.18	.41	-.13	-.
8. facilities								1 00	.51	.34	58	.04	.10	.08	.41	-.44	-.26	.
9. discipline									1.00	.31	.50	-.15	-.34	.36	.14	-.17	-.19	-.
10. overall quality										1 00	.82	.10	.09	.34	.20	-.09	-.43	-.
11. school environment(total)											1.00	-.04	-.08	.41	.74	- 12	-.47	-.
12. Missing class												1.00	.56	-.20	.40	.13	- 14	-
Success																		
13. ability													1 00	-.13	.27	-.08	-.19	-
14. effort														1.00	.01	.14	- 63	-
15. subject easy															1.00	-.18	-.54	-.
Failure																		
16. lack of ability																1.00	-.13	-.
17. lack of effort																	1.00	.
18. subject defficulty																		1
19. Intelligence																		
Language proficiency																		
20. lower level																		
21. higher level																		
22. languistic level																		
Science achievement.																		
23. level - I																		
24. level - II																		
25. Nursery education																		
26. School achievement																		

school achievement. Language proficiency - higher level has higher correlations with linguistic level, science achievement - level I and level II, nursery education and school achievement. Language profeciency - linguistic level has higher relationships with science achievement - level I and level II and school achievement. Science achievement - level I and level II are highly related and both show higher correlations with nursery education and school achievement. Nursery education too has higher correlation with school achievement.

F-ratios

F-ratios in table 3.8 point out that of the 26 variables, 22 have the potential to discriminate the groups. The highest differences among the groups are seen in nursery education followed by school achievement, science achievement - level I, overall quality of the school, science achievement - level II, intelligence, language proficiency - higher level, educational aspiration, achievement value, missing class, failure - lack of effort, involvement, success - effort, language proficiency - lower level, teacher-student relationship, success-subject easy and failure-subject difficulty. As compared to these the remaining four variables, the parental concern, discipline, success-ability and failure-lack of ability have considerably less discriminatory power.

Canonical Discriminant Analysis

Eigen values and factor pattern:

Results in table 3.9 reveal that the first three functions have the ability to discriminate the groups from private and public schools. The eigen values and their associated canonical correlations indicate the relative ability of each function to discriminate the groups. The eigen values for the first three functions are 4.72, 1.84 and 1.10 respectively. The first three functions together account for 68.3% of the variance among groups. The first function explains maximum variation to the extent of 42.12% while the second function accounts for 16.38%. The third function accounts for only 9.82% of variance among groups. It is observed that the rest of the functions have less ability to discriminate the groups.

Results from table 3.10 and figures 3.10a, 3.10b and 3.10c are used to identify the emerging factor pattern for discriminant functions. Factors are characterized by specific student and school environment

Table 3.8 Univariate F ratios and coefficient of variation % over groups

Variables	$F^{@}$	Coefficient of variation %
1 Achievement value	4.12	80.0
2 Study behaviour	8.36	33.6
3 Educational aspiration	4.95	69.2
4 Parental concern	1.42	18.2
School environment:		
5 - academic emphasis	5.41	40.9
6 - involvement	3.18	28.0
teacher-student relationship	2.88	26.8
8 - facilities	5.45	48.9
9 - discipline	1.36	48.9
10 - overall quality	14.34	74.0
11 - school environment (total)	7.95	30.4
12 Missing class	3.86	457.0
Success :		
13 - ability	1.25	378.5
14 - effort	3.10	208.0
15 - subject easy	2.60	538.1
Failure :		
15 - lack of ability	1.17	718.2
17 - lack of effort	3.49	271.2
18 - subject difficulty	2.45	356.2
19 Intelligence	10.00	56.5
Language proficiency :		
20 - lower level	3.00	41.1
21 - higher level	5.10	110.8
22 - linguistic level	9.39	142.6
Science achievement:		
23 - level I	16.92	118.0
24 - level II	11.82	222.8
25 Nursery education	37.77	326.8
26 School achievement	17.07	118.0

@ with 32 and 422 degree of freedom

[illegible].9 Eigenvalues and Related Test Statistics

	Canonical Correlation	[illegible] Value	Eigen V Imp	Chi square	NDF	Lambda
	.91	.8253	4.72	2910.3	832	0.001
	.81	.6475	[illegible].84	2069.8	775	0.008
	.72	.5210	[illegible].10	1627.2	720	0.022
	.60	.3544	0.55	1312.0	667	0.046
4	.57	.3260	0.49	1126.3	616	0.070
	.54	.2956	0.42	959.9	567	0.105
	.54	.2934	0.42	810.1	520	0.148
	.47	.2195	0.28	662.6	475	0.210
	.43	.1862	0.23	557.4	432	0.269
	.41	.1649	0.20	470.0	391	0.331
10	.39	.1485	0.17	393.5	352	0.396
11	.35	.1243	0.14	325.3	315	0.465
12	.33	.1114	0.13	269.0	280	0.531
13	.32	.1002	0.11	218.9	247	0.597
14	.29	.0823	0.09	174.0	216	0.664
15	.27	.0713	0.08	137.5	187	0.723
16	.24	.0579	0.06	106.1	160	0.779
17	.23	.0521	0.06	80.8	135	0.827
18	.21	.0427	0.05	58.1	112	0.872
19	.18	.0322	0.03	39.6	91	0.911
20	.14	.0205	0.02	25.7	72	0.941
21	.12	.0143	0.02	16.9	55	0.961
22	.10	.0100	0.01	10.7	40	0.975
23	.09	.0077	0.01	6.5	27	0.985
24	.09	.0076	0.01	3.2	16	0.993
25	.05	.0021	0.00	0.0	7	1.000

Table 3.10 Factor pattern for canonical discriminant functions

Variables	I	II	III
1 Achievement value	.23	.08	.05
2 Study behaviour	.29	-.18	.03
3 Educational aspiration	.24	.04	-.05
4 Parental concern	.06	-.05	-.09
School environment:			
5 - academic emphasis	.18	-.13	.01
6 - involvement	.11	-.17	-.05
7 - teacher-student relationship	-.08	-.11	.05
8 - facilities	.25	.02	-.16
9 - discipline	.06	-.03	-.04
10 - overall quality	.29	-.29	.03
11 - school environment(total)	.22	-.21	-.04
12 [illegible]	.15	.07	.15
Success:			
13 - ability	.10	.05	.05
14 - effort	.04	-.08	.06
15 - subject easy	.15	.00	.00
Failure :			
16 - lack of ability	-.06	-.01	.09
17 - lack of effort	-.14	.04	-.07
18 - subject difficulty	-.03	.02	-.05
19 intelligence	.29	.13	.13
Language proficiency:			
20-lower level	-.04	-.06	-.18
21 - higher level	.24	-.08	-.08
22 - linguistic level	.18	-.24	-.16
Science achievement :			
23 - level - I	.41	-.18	.08
24 - level - II	.39	-.10	.00
25 Nursery education	.56	.05	-.07
26 School achievement	.45	-.03	-.07

variables which are highly correlated with them. These are indicated by plotting the factor pattern data and showing them as vectors.

Table 3.10 and the related figures suggest that nursery education, school achievement, science achievement level I and level II, intelligence, study behaviour, facilities (school), language proficiency - higher level, educational aspiration, achievement value and failure-lack of effort have highest contributions to the first factor. While failure-lack of effort is negatively loaded, the remaining variables are positively loaded to the first factor. Though nursery education, school achievement and science achievement - level I and level II form the dominant variables, these 11 variables essentially reflect the level of academic emphasis and form a cluster, and as such the first factor is termed as academic orientation.

The second factor is loaded negatively by overall quality of school, language proficiency - linguistic level, school environment, academic emphasis, involvement and teacher-student relationship. Since the major variables involved in contributing to this factor are the components of school environment, the second factor is called school environment.

The negative side of the third factor is loaded by language proficiency-lower level (-.18) and linguistic level (-.16). Facilities has equal contributions to factors one and three. Since language proficiency provides a meaningful interpretation, the negative side of the third factor is termed as language proficiency. The positive side of the third factor is loaded by missing class (.15) and this side is called missing class which implies a deliberate tendency to miss the class.

Projection of groups on the plane of discriminant functions I and II, I and III, and II and III are represented in table 3.11 and the corresponding figures 3.11a, 3.11b and 3.11c. The figure 3.11a illustrates that the plot divides the groups depending upon their locations. The groups which are low in academic orientation and in school environment form one extreme category. Groups 29 (SES L.M), 30(SES A.F), 31 (SES L.F) from private low quality school, I as well as 32 (SES L.M) and 33 (SES L.F) from public low quality school, J are located in a cluster and form this category suggesting that low quality schools whether private or public are extremely low on

Table 11 Group centroids in canonical space

School Code	Group [illegible]	Group Number	I	II	III
	SES-H-F	01	.79	.03	-.21
A	SES-L-F	02	.73	.01	-.24
B	SES-H-M	03	.63	.28	.00
	SES-A-M	04	.59	.23	.00
C	SES-H-F	05	.70	.12	.13
C	SES-A-F	06	.52	-.04	-.05
C	SES-L-F	07	-.10	-.06	.14
D	SES-A-M	08	.13	-.40	.36
D	SES-L-M	09	-.28	-.81	.47
D	SES-A-F	10	-.51	-.79	.30
D	SES-L-F	11	-.43	-.61	.28
E	SES-A-M	12	.32	-.26	.05
E	SES-L-M	13	.08	-.22	.09
E	SES-H-F	14	.42	-.22	-.41
E	SES-A-F	15	-.25	-.27	-.13
E	SES-L-F	16	-.55	-.27	-.16
F	SES-A-M	17	.04	-.08	-.40
F	SES-L-M	18	-.30	-.22	-.08
F	SES-A-F	19	-.41	-.49	-.50
F	SES-L-F	20	-.63	-.47	-.53
G	SES-A-M	21	.31	.06	-.22
G	SES-L-M	22	-.33	-.26	.18
G	SES-A-F	23	-.12	-.06	-.57
G	SES-L-F	24	-.48	-.32	-.37
H	SES-H-M	25	.59	.10	.35
H	SES-A-M	26	.30	.32	.41
H	SES-L-M	27	-.10	.26	1.01
I	SES-A-M	28	-.44	.18	-.23
I	SES-L-M	29	-.70	.40	-.01
I	SES-A-F	30	-.76	.30	-.13
I	SES-L-F	31	-.74	.44	.06
J	SES-L-M	32	-.77	.52	-.02
J	SES-L-F	33	-.78	.37	.03

SES = Socio-Economic Status
H = High
A = Average
L = Low
M = Male
F = Female

Fig 3.10a: Factor Pattern Plots for Discr Functions I & II

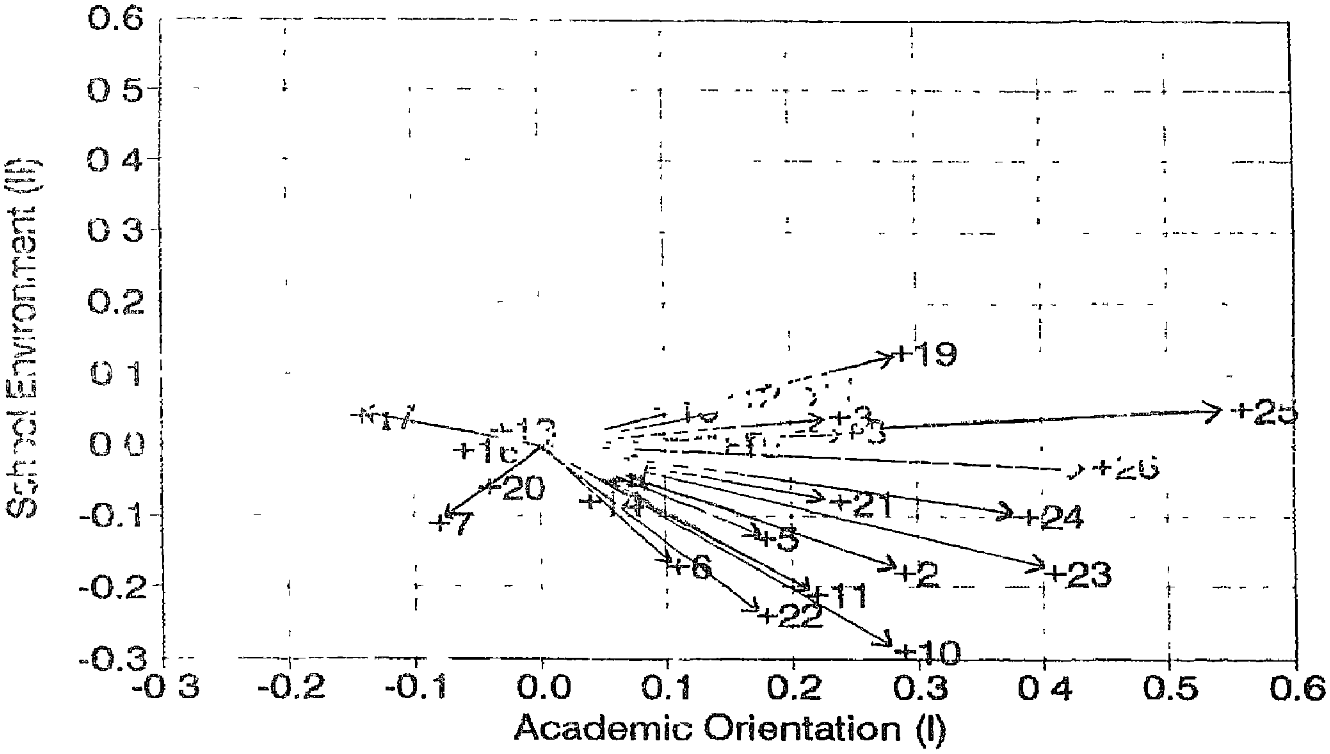
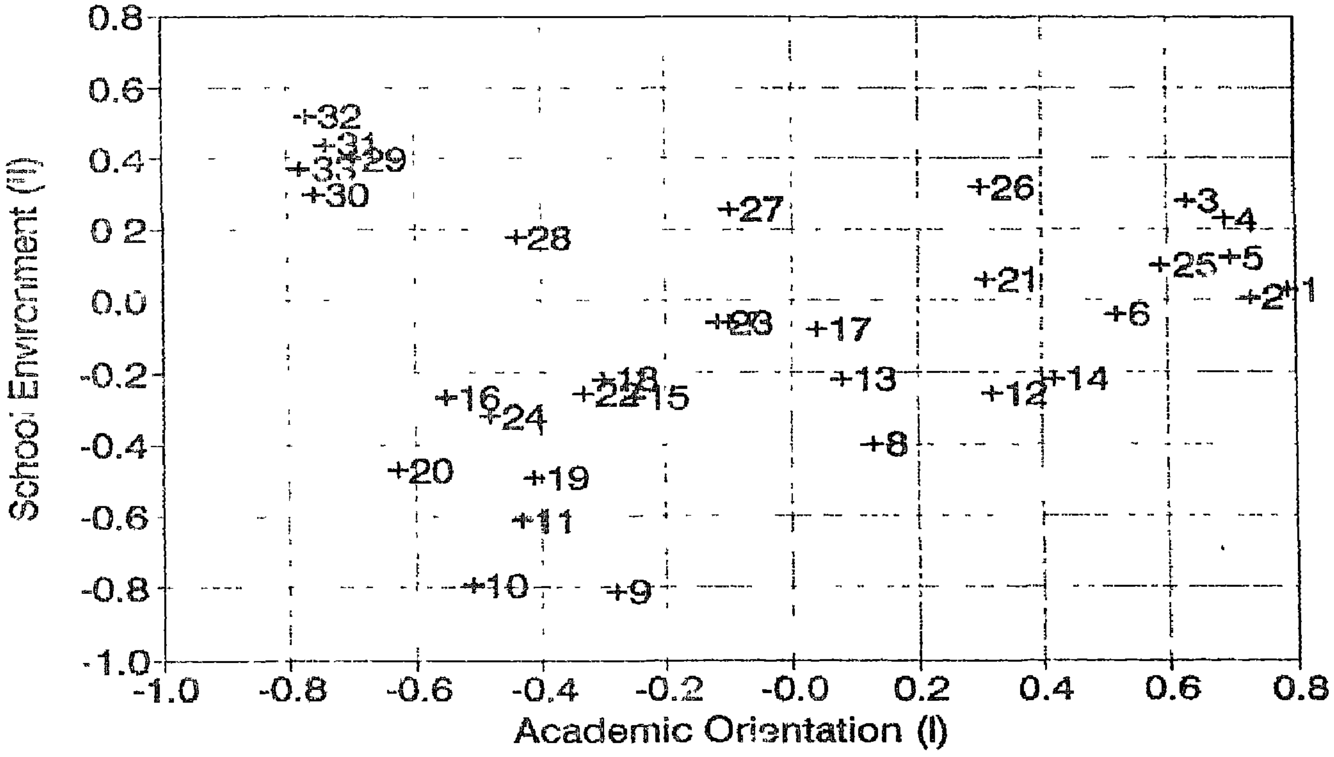


Fig 3.11a: Projection of School Groups on the plane of Discr Functions I & II



mic orientation and school environment. Though group 28 (SES A.M) (from private low quality school, I wich its too low students' size [illegible] located slightly away from this cluster, it is also low on both academic orientation and school environment. Examination of group [illegible] (table 3.6) reveals that these groups are considerably low on achievement value, study behaviour, school environment, intelligence, language proficiency – higher and linguistic level, science achievement level I and II, nursery education and school achievement.

Groups 1 (SES H.F), 2 (SES A.F), 3 (SES H.M), 4(SES A.M), 5(SES H.F) and 25 (SES H.M) form a cluster indicating high on academic orientation and either average or low on school environment. Groups 1 and 2 from private high quality school, A are highly academic oriented with an average school environment, while groups 3 and 4 from private high quality school, B are also highly academic oriented but the school environment is relatively low. Group 5, from public high quality school, C and group 25 from public average quality school, H are also high on academic orientation but the school environments are relatively low for them. It is interesting to note that these groups 1,2,3,4,5 and 25 hail from average or high social backgrounds implying that students from higher social origins irrespective of sex are highly academic oriented and they perceive that the environments of schools they attend are either average or low. When the location of groups are related to the vector plots in figure 3.10a it appears that the groups' differences from the rest are magnified by their nursery education background.

Though these groups form a cluster, groups 1 and 2 are located closely just as groups 3 and 4 implying that there exists homogeneity among groups within each private high quality school on academic orientation and school environment. Likewise, groups from private and public low quality schools too show the homogeneity pattern. However, groups from other schools are scattered in the plot. In public high quality school, C, for instance, groups 5(SES H.F), 6(SES A.F) and 7(SES L.F) differ on academic orientation and school environment. On academic orientation groups 5,6 and 7 are high, moderately high and low respectively while on school environment group 5 perceives it as low, groups 6 and 7 consider it as average. It appears from table 3.6

that among them, 6 has higher mean on school environment followed by 7 and the least is for 5. On science achievement level I and II, nursery education and school achievement group 7 has lower means than groups 5 and 6.

Likewise in public average quality school H, though all the groups 25(SES H.M), 26(SES A.M) and 27(SES L.M) perceive that the school environment is low, the groups differ on academic orientation. Group 25 is high, 26 is moderately high and 27 is low on academic orientation. Group means (table 3.6) on school environment as well as language proficiency - higher level and linguistic level, science achievement - level I and II, nursery education and school achievement confirm the observed pattern of groups on academic orientation and school environment

On the other hand in public average quality school, E groups 12 (SES A.M), 13 (SES L.M), 14 (SES H.F), 15 (SES A.F) and 16 (SES L.F) perceive school environment as moderately high but they differ considerably on academic orientation. While groups 12 and 14 are moderately high, 13 is average and 15 and 16 are considerably low on academic orientation. The group means (table 3.6) on school environment as well as science achievement - level II, nursery education and school achievement reflect the groups' pattern on school environment and academic orientation. With regard to public high quality school, D groups 8(SES A.M), 9 (SES L.M), 10 (SES A.F) and 11 (SES L.F) as a whole perceive school environment as high. Except group 8 which is at average level, the remaining groups are considerably low on academic orientation. Similar patterns are also highly visible for private average quality schools, F and G.

The emerging trend suggests that low quality schools whether private or public are considerably low on both academic orientation and school environment. Where as private high quality schools are high on academic orientation with either average or low level of school environments. What is striking is the homogeneity of groups with in each school that has been observed in private high quality schools as well as private and public low quality schools. However, this homogeneity phenomenon is not visible among the groups from public high and average as well as private average quality schools. Precisely, with the exception of school, H, the remaining public high and average quality

schools, and private average quality schools in general indicate either average or high school environment but the groups in each school differ considerably on academic orientation. It is not surprising to find high academic orientation among those who hail from high social origin and low academic orientation among those from low social origin. It is interesting to note that those from both average and low social origins attending public high or average or private average schools, in general, perceive school environment as important.

Figure 3.11b depicts the groups on the plane of academic orientation and language proficiency-missing class. Groups 29, 30, 31, 32 and 33 from low quality private and public schools form a cluster reflecting average level of language proficiency with the tendency to miss class among a sizable number and extremely low level of academic orientation. On the other hand, groups 1 and 2 from private high quality school, A are high on academic orientation and language proficiency while groups 3 and 4 from private high quality school, B are high on academic orientation and average on language proficiency with the tendency to miss class. Though the groups from private high quality schools and those from low quality private and public schools have distinct patterns, public high and average, and private average quality schools do not show such distinct patterns on academic orientation and language proficiency - missing class. However, it appears that students from public high and average quality schools by and large have the tendency to miss class while those from private average quality schools in general show language proficiency.

Figure 3.11c shows groups on the plane of school environment and language proficiency - missing class. Groups 8,9,10 and 11 from public high quality school, D are homogeneous in the sense that they perceive the school environment as high and show the tendency to miss classes. Homogeneity is also observed in public average quality school, H where groups 25, 26 and 27 indicate school environment as low and show tendencies to miss classes. Homogeneity phenomenon is also observed in private high quality schools, A and B as well as in both low quality schools. Groups 1 and 2 from school, A perceive school environment as average and show high language proficiency. Where as groups 3 and 4 in school, B perceive school environment as low but they are average in language proficiency and prone to miss classes. Likewise, those from

Fig 3.10b: Factor Pattern Plots for Discr Functions I & III

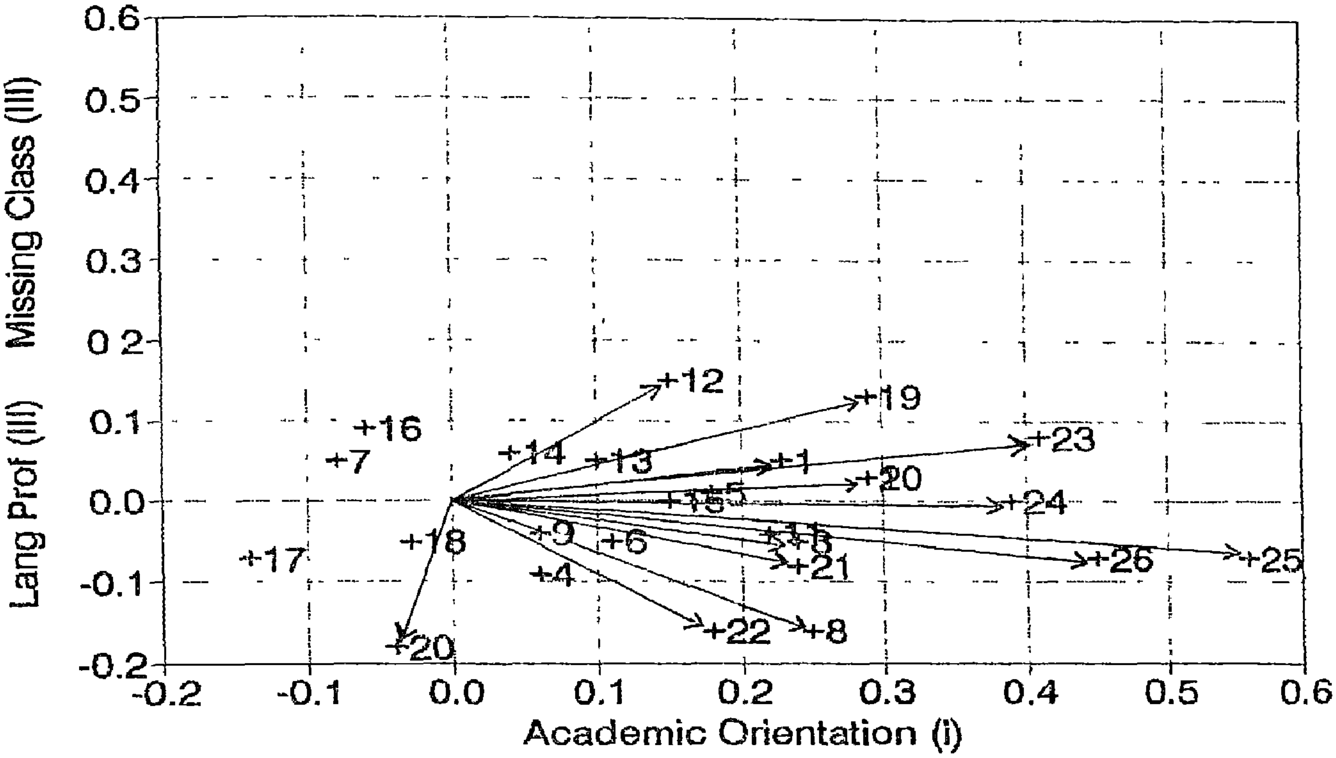


Fig 3.11b: Projection of School Groups on the plane of Discr Functions I & III

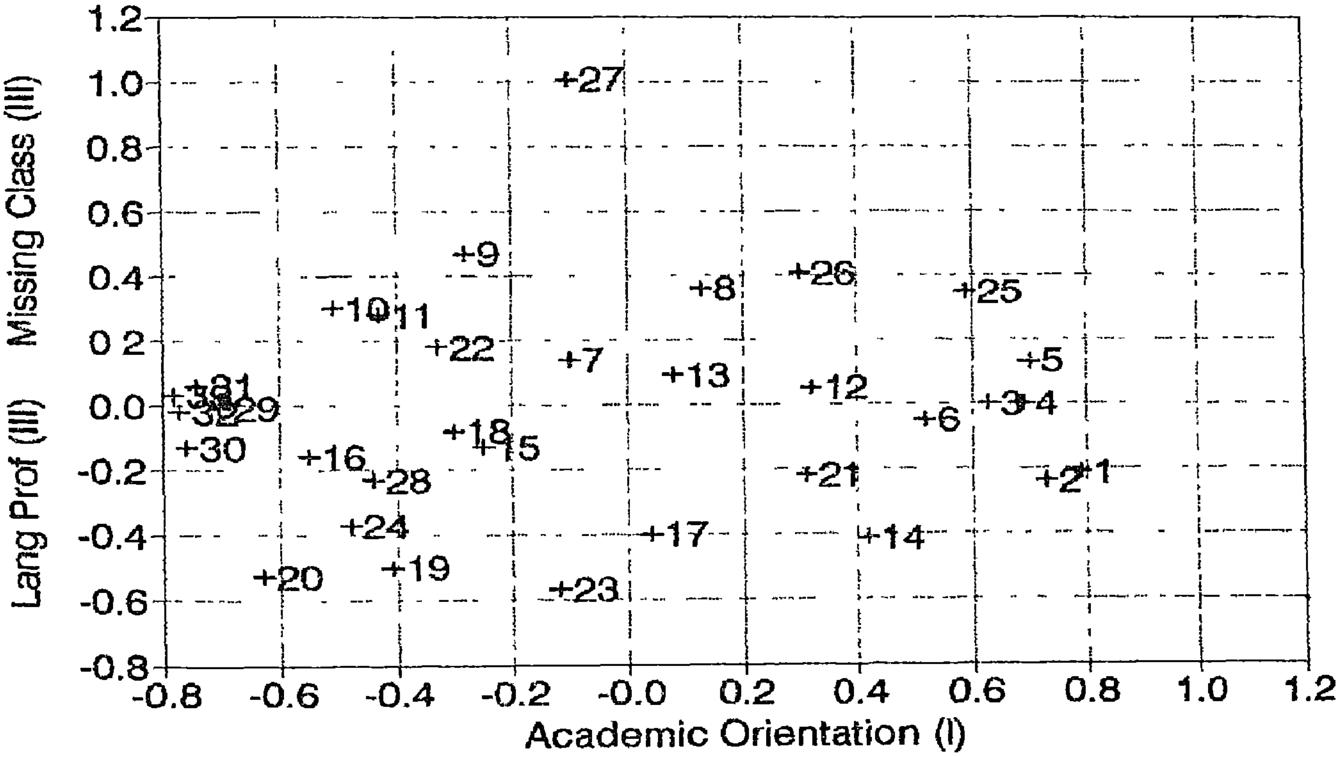


Fig 3.10c: Factor Pattern Plots for Discr Functions II & III

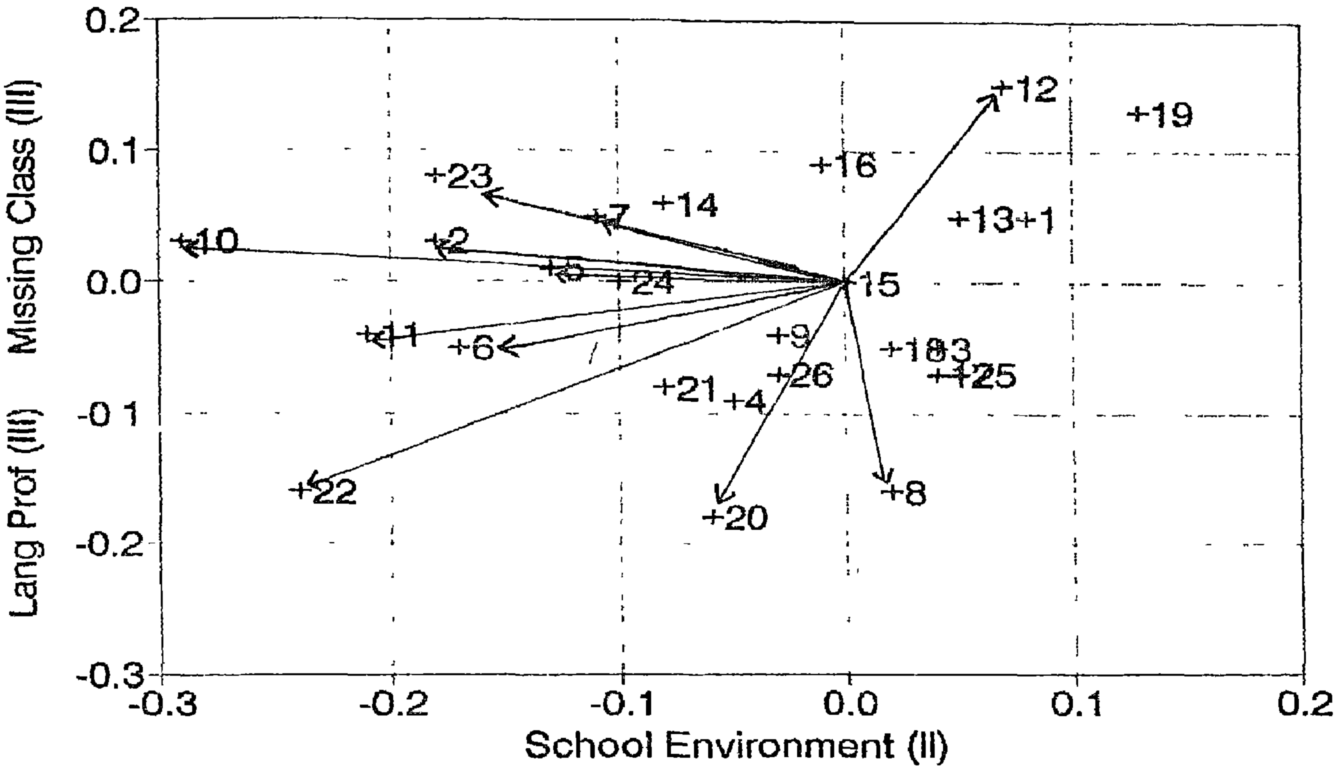
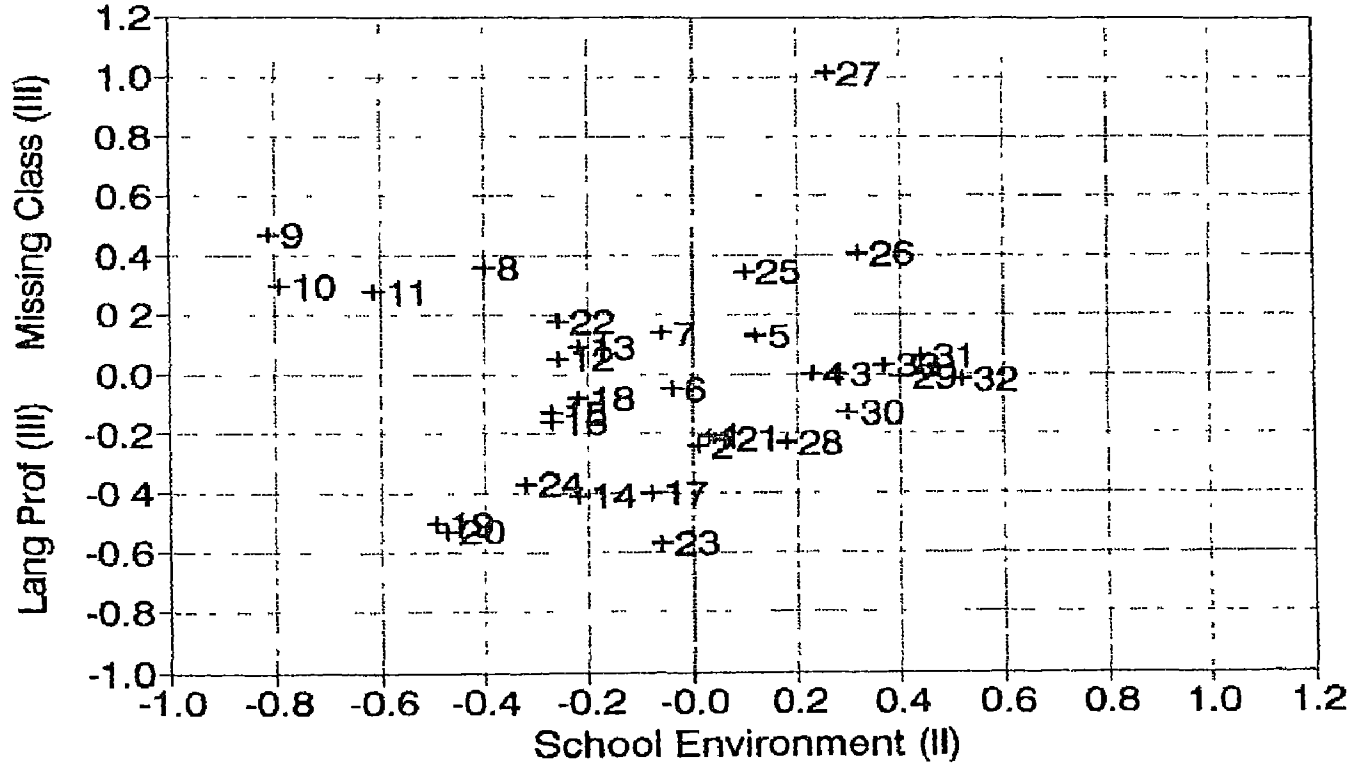


Fig 3.11c: Projection of Sch Groups on the plane of Discr Functions II & III



low quality private and public schools perceive school environment as considerably low and a sizable number of them have average level language proficiency and tendency to miss class. However, the remaining groups do not show any definite school wise pattern. In general, sex wise differences are not noticed.

Section - 3

Integration of evidences based on principal component analysis of data on school variables obtained from teachers and head masters or head mistresses (Section - 1) and discriminant analysis of data obtained from students (Section - 2) suggests the following pattern of school differences.

The emerging pattern points out that among private and public schools, only private high quality schools, A and B have effective management systems. While the teacher-student ratio is low in school, A it is relatively high in school, B and both schools have adequate facilities. Students of both private high quality schools are highly academic oriented. It is strikingly visible that students of private high quality school, A perceive their school environment as average while for those from private high quality school, B the school environment is low. Students of private high quality school, A are high on language proficiency and those from private high quality school, B are average on language proficiency and show a tendency to miss class. Students attending these two schools hail from average and high social origin backgrounds.

With regard to public high quality schools, school C despite its higher teacher-student ratio shows moderately effective management system and higher work ethics. With in the school, students from high social origin group (5) are high on academic orientation and those from average social origin group (6) are moderately high on academic orientation. Students from low social origin group (7) are low on academic orientation. Students from low and average social origin groups perceive school environment as average and for those from high social origin groups the school environment is low. Students from high and low social origin groups have tendencies to miss class. Public high quality school, D too show higher work ethics in the background of

average level of management system and low level of teacher-student ratio. Though all the groups from school-D perceive school environment as high, except group 8, the remaining groups are low on academic orientations. All groups have the tendency to miss class.

Low quality schools whether private (school I) or public (school J) are weak in management systems despite low level of teacher-student ratio. While school I gives importance to work ethics, school J indicates that it has adequate facilities. Both schools are considerably low on academic orientation and school environment. Students of both schools, in general have average level of language proficiency and show a tendency to miss class.

With regard to average quality schools, private F and G and public E and H, the management system is average except in the case of F where it is relatively weak. However, private and public average quality schools differ on teacher-student ratio where the ratio is high in public schools. While school F reflects work ethics, schools E, G and H indicate adequate facilities. Groups from these schools are highly scattered suggesting no definite school wise pattern. However, among these schools low social origin groups are invariably low on academic orientation while high social origin groups, though less in number, are academic oriented. Among average social origin groups approximately half are academic oriented and the remaining are low on academic orientation. Students from E, F and G by and large perceive that the environment of school is relatively high while all those from school, H perceive it as low. Students from public average quality school in general show the tendency to miss class and those from private average quality school indicate language proficiency.

Homogeneity among groups with in school is highly visible in extreme categories of schools. In private high quality school, A both groups indicate school environment as average and they are highly academic oriented. On language proficiency the groups are high. In private high quality school, B both groups perceive school environment as low and they are highly academic oriented. The groups are average on language proficiency and show the tendency to miss class. Students of private and public low quality schools indicate that the environments of both schools as well as their academic orientations are considerably low. By and large, the students show average level of language

proficiency and a tendency to miss class. The homogeneity phenomenon is highly visible in private high quality schools as well as private and public low quality schools.

On the other hand, in public high quality and average quality schools, and private average quality schools homogeneity phenomenon by and large is not observed. However, in public high quality school, D and public average quality school, H the homogeneity phenomenon is observed on the planes of school environment and language proficiency - missing class. While all the groups in school, D perceive school environment as high and show the tendency to miss class those from school, H too show the tendency to miss class but the school environment is low. Thus, the homogeneity phenomenon implies that the students attending a particular school invariably have similar patterns of behaviour.

In general, if the student groups are considered on the basis of social origin, those from high social origin are highly academic oriented and those from low social origin are low on academic orientation. With regards to average social origin groups nearly half of them are academic oriented as the rest are low on academic orientation

Section - 4

Modelling through multiple regression for the prediction of school achievement.

School achievement is predicted using school factor and student factor variables. Socio-economic status is grouped into 3 levels, low, average and high. To incorporate it into the model, two dummy variables, SO1 and SO2 are devised for the purpose with each assuming values 0 or 1. Values of both are zeroes for low level, for average level SO1 is 0 while SO2 is 1 and for high level both are 1 each.

The multiple regression is carried out in the following steps.

1. Using school factor variables
2. Using student factor variables
3. By combining the selected variables from 1 and 2.

The dummy variables which appear in all the models are set to their proper values to derive regression models for students of low, average and high socio-economic status. These equations with necessary details are only reported.

1. School factor variables: besides the dummy variables and school achievement, 15 school factor variables are included in this model and the fitted equations for students of low, average and high socio-economic status are stated below.

School achievement (SES Low) =/- 481.46 + 158.87 (LS) -23.40(MC) -49.29(MF) +40.40(TS) -48.12 (WE) -0.36 (SS) +1.10 (FP) +0.58 (SP) +14.42 (OQ_1) -13.99 (AE) +0.73 (IV) -10.42 (TSR) +1.38 (FA) -9.56 (OQ_2) +8.44 (SE).

School achievement (SES Average) = - 479.67+158.87 (LS) -23.40 (MC) -49.29(MF) +40.40(TS) -48.12(WE) -0.36 (SS) +1.10(FP) +0.58(SP) +14.42 (OQ_1) -13.99 (AE) +0.73 (IV) -10.42(TSR) +1.38 (FA) -9.56 (OQ_2) +8.44 (SE).

School achievement (SES High) = -469.11 +158.87 (LS) - 23.40 (MC) -49.29 (MF) +40.40 (TS) -48.12 (WE) -0.36 (SS) +1.10 (FP) +0.58 (SP) +14.42 (OQ_1) -13.99 (AE) +0.73 (IV) -10.42 (TSR) +1.38 (FA) -9.56 (OQ_2) +8.44 (SE).

The multiple R is 0.94 and the F-ratio is 6.84 with 17 and 15 degrees of freedom ($P < 0.001$) explaining 89% of the variation in school achievement. It means that 89% of the variation in school achievement is accounted by this model consisting of all the school factor variables. Based on t-values, certain variables are dropped ($t < 1.00$).

LS= level of selectivity
MC= management control
MF= management facility
TS= teacher-student ratio
WE= work ethics
SS= school size
FP= fees per pupil
SP= school expenditure
OQ_1= overall quality of school perceived by teachers and heads of schools

School Environment Components

AE= academic emphasis
IV = involvement
TSR = teacher-student relationship
FA = facilities
OQ_2= overall quality of school perceived by students
SE = school environment (total).

The variables dropped consist of level of selectivity, management control, management facility, teacher-student ratio, work ethics, school size, fees per pupil, school expenditure and overall quality (OQ_1), and two components of school environment-involvement and facilities. In other words these variables which have less effect in explaining the variations in school achievement - are dropped. Those variables which have greater effects are only considered and they consist of school environment and its components viz., academic emphasis, teacher-student relationship and overall quality (OQ_2). The model is refitted using these 4 variables and yielded the following results.

School achievement (SES Low) = $-27.41 + 0.57$ (AE) -6.73 (TSR)
-1.64 (OQ_2) $+2.54$ (SE).

School achievement (SES Average) = $-20.24 +0.57$ (AE) -6.73 (TSR)
-1.64 (OQ_2) $+2.54$ (SE).

School achievement (SES High) = $-10.50 +0.57$ (AE) -6.73 (TSR)
-1.64 (OQ_2) $+2.54$ (SE)

The multiple R is 0.82 and the F-ratio is 8.91 with 6 and 26 degrees of freedom ($P < 0.001$) explaining 67% of the variation in school achievement. In other words, the censored model consisting of 4 school factor variables explaining 67% of variation in school achievement. Based on beta $* \gamma$ magnitudes (beta weights are standardised regression coefficients and γ is the correlation between a variable and school achievement) school environment (0.39) emerges as the most important variable followed by school environment components i.e., overall quality, OQ_2(0.05), academic emphasis (0.03) and teacher-student relationship (0.02). Results further explain that given effective school environment conditions students from high social origin groups are expected to do well in school achievement followed by those from average and low social origin groups. It seems that social origin backgrounds of students have profound effect on school achievement in the context of school environment.

Observed school achievements and the model (school factor variables) predicted school achievements for 33 groups are shown below.

Group	Observed School Achievement	Predicted School Achievement	
		Full model	Censored model
01	75.5	77.4	66.8
02	65.5	63.6	59.2
03	69.6	68.5	62.9
04	65.1	66.2	49.1
05	55.3	55.9	56.8
06	49.9	51.2	58.1
07	41.6	39.7	44.6
08	49.7	44.4	50.5
09	43.8	43.0	42.1
10	32.3	35.0	37.7
11	45.3	48.7	46.3
12	48.4	50.3	46.1
13	38.3	28.4	28.1
14	57.3	60.4	55.7
15	33.8	33.1	43.5
16	34.8	40.4	41.6
17	49.5	51.5	57.7
18	40.3	37.9	42.2
19	40.7	45.3	53.2
20	34.0	29.8	32.1
21	58.3	54.7	57.4
22	44.7	45.0	43.0
23	47.8	50.7	61.6
24	40.6	41.1	47.7
25	54.6	46.3	44.6
26	44.1	49.2	41.4
27	41.2	44.4	37.5
28	73.7	59.9	54.4
29	30.2	36.5	32.1
30	29.2	35.6	39.7
31	28.1	29.2	26.0
32	25.0	23.7	24.7
33	30.7	32.0	34.6

When predictions of school achievement based on full model (all school factor variables) are matched with observed school achievement, it appears that 9 out of 33 groups show differences of 5 or more percentage points in school achievement. Predictions of school achievement based on censored model (using most potential school variables) indicate that 16 out of 33 groups show differences of 5 or more percentage points. It implies that while in full model 27% of the groups' school achievement cannot be predicted based on school variables alone, in censored model 48% of the groups' school achievement can not be predicted just based on school factor variables.

Thus, the result indicates that school environment and its components such as overall quality (OQ_2), academic emphasis and teacher-student relationship are the most potential school factor variables which have important consequences for school achievement. As compared to these, the effect of the rest of the school factor variables is much less. Variables appearing in the censored model are consolidated with those obtained from the model based on student attributes for evolving a model consisting of the important attributes of both school and students.

2. Student factor variables: there are 15 variables in student factor set in addition to dummy variables and school achievement, and the fitted equations for students of low, average and high socio-economic status are given below.

School achievement (SES Low) = -68.15 -1.36 (AV) +0.46 (SB) +12.66 (EA) +1.37 (MC) +17.81 (SF) +0.94 (SSE) +19.13 (FE) +19.65 (FSD) +0.78 (IN) -1.39 (LPL) -1.56 (LPH) +4.89 (LPLL) +0.38 (SL_1) +3.35 (SL_2) -6.96 (NE).

School achievement (SES Average) = -63.71 -1.36 (AV) +0.46 (SB) +12.66 (EA) +1.37 (MC) +17.81 (SF) +0.94 (SSE) +19.13 (FE) +19.65 (FSD) +0.78 (IN) -1.39 (LPL) -1.56 (LPH) +4.89 (LPLL) +0.38 (SL_1) +3.35 (SL_2) -6.96 (NE).

School achievement (SES High) = - 56.73 -1.36 (AV)+0.46 (SB) +12.66 (EA) +1.37 (MC) +17.81 (SF) +0.94 (SSE) +19.13 (FE) +19.65 (FSD) +0.78 (IN) -1.39 (LPL) -1.56 (LPH) +4.89 (LPLL) +0.38 (SL_1) +3.35 (SL_2) -6.96 (NE).

The multiple R is 0.96 and the F-ratio is 10.80 with 17 and 15 degrees of freedom ($P < 0.001$) explaining 92% of the variation in school achievement. Based on t-values, certain student factor variables are

dropped ($t < 1.00$). Student factor variables which have greater effects are only considered and they include educational aspiration, success - effort, failure - lack of effort, failure-subject difficulty, intelligence, language proficiency-linguistic level and nursery education. The model is refitted using these 7 variables and the results are explained below.

School achievement (SES Low) = -36.03 +10.76 (EA) +5.19 (SF) +1.96 (FE) +3.52 (FSD) +0.80 (IN) +5.70 (LPLL) +1.54 (NE).

School achievement (SES Average) = - 34.70 +10.76 (EA) +5.19 (SF) +1.96 (FE) +3.52 (FSD) +0.80 (IN) +5.70 (LPLL) +1.54 (NE).

School achievement (SES High) = - 29.85 +10.76 (EA) +5.19 (SF) +1.96 (FE) +3.52 (FSD) +0.80 (IN) +5.70 (LPLL) +1.54 (NE).

The multiple R is 0.93 and the F-ratio is 17.49 with 9 and 23 degrees of freedom ($P < 0.001$) explaining 87% of the variation in school achievement. It means that the censored model consisting of 7 student factor variables explain 87% of the variation in school achievement. Based on beta *γ magnitudes educational aspiration (0.30) emerges as the most important variable followed by intelligence (0.27), language proficiency - linguistic level (0.16), nursery education (0.04), success - effort (0.03), failure - lack of effort (-0.02) and failure - subject difficulty (-0.01). In the context of these student attributes those from high social origin groups will attain higher school achievement by a margin of 5 percentage points as compared to those from average or low social origin groups. Though those from average social origin groups have an edge over the low social origin groups, the difference is less than 2 percentage points.

AV = achievement value SB = study behaviour EA = educational aspiration MC = missing class SF = success - effort
SSE = success - subject easy FE = failure - lack of effort
FSD = failure - subject difficulty IN = intelligence
LPL = language proficiency - lower level LPH = language proficiency - higher level LPLL = language proficiency - linguistic level
SL_1 = science achievement - level I, SL_2 = science achievement - level II NE = nursery education.

Observed school achievements and the model (student factor variables) predicted school achievement for 33 groups are explained below.

Group	Observed School Achievement	Predicted School Achievement	
		Full model	censored model
01	75.5	71.8	70.7
02	65.5	65.9	62.0
03	69.6	68.3	70.0
04	65.1	62.4	63.1
05	55.3	58.3	59.6
06	49.9	54.9	60.0
07	41.6	33.7	33.0
08	49.7	47.4	46.4
09	43.8	50.6	47.5
10	32.3	33.6	34.0
11	45.3	46.8	44.7
12	48.4	45.2	44.6
13	38.3	38.9	43.8
14	57.3	64.6	63.9
15	33.8	36.9	34.4
16	34.8	39.8	37.9
17	49.5	51.6	50.5
18	40.3	41.1	39.0
19	40.7	39.3	39.2
20	34.0	30.1	28.8
21	58.3	53.8	53.6
22	44.7	44.2	40.7
23	47.8	45.6	46.4
24	40.6	36.9	39.2
25	54.6	57.2	55.7
26	44.1	42.6	41.2
27	41.2	42.2	34.8
28	73.7	66.0	66.6
29	30.2	29.9	33.5
30	29.2	30.3	28.4
31	28.1	26.1	31.2
32	25.0	27.3	33.8
33	30.7	35.1	40.7

When predictions of school achievement based on full model are matched with observed school achievement, it appears that 4 out of 33 groups show differences of 5 or more percentage points in school achievement. The censored model indicates that 9 out of 33 groups show differences of 5 or more percentage points. It means that while in full model around 12% of the groups school achievement can not be predicted based on student factor variables alone, it is nearly 27% in the case of censored model. With regard to school factor variables, the percentages are 27 and 48 for full model and censored model respectively. The inference is that the student factor variables are more effective than school factor variables in predicting school achievement. Thus, among student factor variables, the most important variables which have greater effects on school achievement are educational aspiration, intelligence, language proficiency-linguistic level, nursery education, success-effort, failure-lack of effort and failure-subject difficulty. These 7 variables appearing in the censored model are consolidated with 4 school factor variables obtained from the censored model to evolve a model consisting of the important attributes of both school and students.

3. Combined school factor and student factor variables

Derived equations based on selected school factor and student factor variables for students of low, average and high socio-economic status are explained below

School achievement (SES Low) = $-85.70 - 2.49$ (AE) -1.47 (TSR) -0.28 (OQ_2) $+2.12$ (SE) $+8.70$ (EA) -1.05 (SF) -0.94 (FE) $+0.59$ (FSD) $+0.94$ (IN) $+2.16$ (LPLL) -4.27 (NE)

School achievement (SES Average) = $-81.75 - 2.49$ (AE) -1.47 (TSR) -0.28 (OQ_2) $+2.12$ (SE) $+8.70$ (EA) -1.05 (SF) -0.94 (FE) $+0.59$ (FSD) $+0.94$(IN) $+2.16$ (LPLL) -4.27 (NE).

School achievement (SES High) = $-74.00 - 2.49$ (AE) -1.47 (TSR) -0.28 (OQ_2) $+2.12$ (SE) $+8.70$ (EA) -1.05 (SF) -0.94 (FE) $+0.59$ (FSD) $+0.94$(IN) $+2.16$ (LPLL) -4.27 (NE).

The multiple R is 0.96 and the F-ratio is 16.94 with 13 and 19 degrees of freedom ($P < 0.001$) explaining 92% of the variation in school

achievement. Based on t-values certain variables are dropped ($t < 1.00$). Variables from school factor and student factor sets viz., academic emphasis, school environment, educational aspiration, intelligence and language proficiency - linguistic level which have greater effects were selected. The model is refitted using these variables and results are explained below.

$$\text{School achievement (SES Low)} = -77.79 - 1.28\,(AE) + 1.43\,(SE) + 9.08\,(EA) + 0.83\,(IN) + 2.81\,(LPLL).$$

$$\text{School achievement (SES Average)} = -75.33 - 1.28\,(AE) + 1.43\,(SE) + 9.08\,(EA) + 0.83\,(IN) + 2.81\,(LPLL).$$

$$\text{School achievement (SES High)} = -69.01 - 1.28\,(AE) + 1.43\,(SE) + 9.08\,(EA) + 0.83\,(IN) + 2.81\,(LPLL).$$

The multiple R is 0.96 and the F-ratio is 38.29 with 7 and 25 degrees of freedom ($P < 0.001$) explaining 91.5% of the variation in school achievement. Both full model and censored model explain almost the same level of variation (92% and 91.5% respectively) in school achievement. In otherwords, censored model with less variables are as effective as the full model. The censored model indicates that academic emphasis, school environment, educational aspiration, intelligence and language proficiency - linguistic level are the most effective school factor and student factor variables in explaining school achievement. Beta $*\gamma$ indicates that intelligence (0.28) emerges as the most effective variable followed by educational aspiration (0.25), school environment (0.22), language proficiency - linguistic level (0.08) and academic emphasis (0.06). In the context of these school factor and student factor variables students from high social origin groups as compared to those from average and low social origin groups will enhance school achievement by more than 5 percentage points. Though average social origin groups indicate higher school achievement than the low social origin groups, the differences between them is only around 2 percentage points.

Observed school achievements and the model (school factor and student factor) predicted school achievements for 33 groups are explained below.

Group	Observed School Achievement	Predicted School Achievement	
		Full model	Censored model
01	75.5	74.3	72.7
02	65.5	62.7	62.4
03	69.6	70.2	70.3
04	65.1	60.0	60.9
05	55.3	59.1	59.1
06	49.9	57.7	58.7
07	41.6	34.4	34.8
08	49.7	48.3	49.4
09	43.8	47.4	48.3
10	32.3	32.6	32.8
11	45.3	45.6	45.9
12	48.4	48.2	48.6
13	38.3	38.9	40.6
14	57.3	61.6	62.2
15	33.8	34.4	32.7
16	34.8	37.6	37.2
17	49.5	55.2	55.9
18	40.3	38.8	36.5
19	40.7	41.3	40.6
20	34.0	27.1	28.2
21	58.3	55.1	54.8
22	44.7	45.6	44.9
23	47.8	47.9	47.8
24	40.6	42.4	42.3
25	54.6	49.6	51.7
26	44.1	40.8	41.7
27	41.2	41.1	40.2
28	73.7	66.5	64.4
29	30.2	32.9	31.9
30	29.2	28.0	27.8
31	28.1	27.9	28.3
32	25.0	28.2	28.6
33	30.7	37.8	36.7

When predicted and observed school achievements in full model are matched, 8 out of 33 groups (24%) show differences of 5 or more percentage points in school achievement. In censored model 6 out of 33 groups (18%) indicate differences between observed and predicted school achievement by 5 or more percentage points. The difference between full and censored models is not much. It means that the variables in the censored model are as effective as those in the full model. The censored model illustrates that school environment and its component, academic emphasis from the set of school factor variables, and intelligence, educational aspiration and language proficiency - linguistic level from the set of student factor variables are the major variables which have important consequences for predicting school achievement.

Thus, the evidences suggest that when school factor variables alone are considered school environment and its components such as overall quality, academic emphasis and teacher-student relationship are the potential variables which have consequences for predicting school achievement. However, 48% of the groups' school achievement can not be predicted just based on these variables. When student factor variables are treated separately, educational aspiration, intelligence, language proficiency - linguistic level, nursery education, success-effort, failure-lack of effort and failure-subject difficulty emerge as the most potential variables which have consequences for explaining school achievement. While 27% of the groups' school achievement cannot be predicted by student factor variables alone, it is 48% in the case of school factor variables. However, the combined model indicates that only 18% of the groups' school achievement cannot be predicted effectively by school factor and student factor variables together. Among them intelligence emerges as the most effective variable followed by educational aspiration, school environment, language proficiency - linguistic level and academic emphasis in predicting school achievement. The inference is that though student factor variables are more effective than school factor variables both have their respective importance in explaining school achievement. Whether it is school factor model or student factor model or the combined model, students from high social origin groups attain higher school achievement followed by those from average and low social origin groups. It means that social origin of students has important consequences in determining who get ahead in academic performance at school.

DISCUSSION AND CONCLUSION

This study addresses the following research questions.

1. Do private and public schools differ by school factors, student characteristics (factors) and school achievement?
2. What are the dimensions/factors by which both private and public schools can be differentiated?
3. What are the effects of school factors and student characteristics (factors) on school achievement?

Evidences related to the first two questions are discussed first and the last question is dealt subsequently.

Private and public school differences.

Who goes to which school? This question seeks to provide the baseline explanations to the first two questions. The emerging trend suggests that students from high and average social class origin have the propensity to attend private high quality schools. Though one may find students from average social class origin in this category of schools, those from high social origin form the dominant group. On the contrary, pirvate and public low quality schools are invariably peopled by students from low social class origin. It is not unusual to find students from average social class origin in low quality schools though they are much less in number. Infact, students from low social origin, precisely those from working class background, form the dominant group in low quality schools whether private or public. Both private high quality schools are located in Calicut city and peopled by students from affluent sections of the society. Public low quality school is located in Calicut city and attended by students from lower class firshermen community. Private low quality school is located in rural area, far away from Calicut city and attended by students from the families of poor peasants and labourers.

However, the picture is different in public high and average quality schools, as well as private average quality schools. These schools are peopled by students from high, average and low social class origin. Certainly, those from high social class origin are a few and the student composition, in general, is heterogeneous by social class origin in these schools. Among these schools, public high quality school-D and private

average quality school-F are located in rural area and the rest are in Calicut city. What does it mean? It simply means that those who are from the affluent sections of the society have the propensity to attend private high quality schools and those from working class background indicate the propensity to attend low quality private and public schools. Public high quality and average quality schools, and private average quality schools are peopled by students from heterogenous social class background. Concentration of students by their level of social class origin in the different levels of private and public schools points out the existing social class variations among them. In otherwords, the student composition in these schools is highly stratified by social class origin and it mirrors the social class stratification system within the society (Khader, forthcoming).

How do we relate this to the school system? The stratified nature of student composition is an off shoot of the admission policy pursued by private and public schools. Though private high quality schools are effective in their management systems, they differ on the related factors. For instance, the management system in School-A, gives considerable importance to highly selective admission policy and higher fees. Infact, school-A, is the only one in this group which is unaided and pursues highly selective admission policy and charges fees. In school-B, the management system is highly related to management control and overall quality. School-B, is selective to a certain extent but does not charge fees as school-A does. Selection policy pursued by these schools enable students from high social class origin to form the dominant group in private high quality schools. On the other hand, in private and public low quality schools where the management system is weak and pursue open door admission policy, invariably students from working class background enrol themselves and form the dominant group.

With regard to public high quality schools the management system varies from average to moderately effective while it is average in public average quality schools. The management system is either average or weak in private average quality schools. All the public schools enroll students based on open door policy. Though private schools at times adopt selective admission[1] with an intention to eliminate students, by and large they do follow open door policy.

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[1] = ascertained during discussions with the headmasters of the schools.

Concentration of students from a particular social class in a specific type or level of school is a reflection of the admission policy pursued by the school. The admission policy and the existing management system are complementary. The main point is whether the management system is oriented to meet the educational needs of a social class group or of all, irrespective of the social class origin. The inference is that the schooling system runs along the line of social class character of the society. In other words, the prevailing inequality in the admission policy of different levels of private and public schools is an extension of the inequality existing within the society.

It is equally important to examine the teacher-student ratio. The emerging pattern explains that public schools in general have higher teacher-student ratio as compared to private schools. In fact, an open door admission policy naturally entails higher teacher-student ratio. It is not surprising, then, to find higher teacher-student ratio in public schools. Despite this, work ethics is strikingly visible in public high quality schools. Teachers of these schools where the facility is considerably limited, more students per teacher and the management system is either average or moderately effective reveal higher work ethics. Work ethics ensures commitment and self involvement of teachers in performing their professional activities and this is more important to maintain the quality of a school than a management system which tries to keep up the academic standards by enforcing strong disciplinary code. Interestingly public high quality schools do show this trend.

It is not unusual to find private high quality schools which maintain effective management system and low teacher-student ratio invariably to select students from high and average social class origins. Evidences demonstrate that students from such social class origin attending private high quality schools are highly academic oriented in the sense that they get early academic stimulation through pre-school system and possess academic oriented behaviours such as higher levels of language proficiency, intelligence, achievement value, educational aspiration and school achievement. It is interesting to note that for the students of school-A, the school environment is at average level, while for those from school-B, it is relatively low. Despite low teacher-student ratio, private and public low quality schools with weak management systems have a student population predominantly from working class background. These students neither get early academic stimulation through

pre-school system nor possess academic oriented behaviours. By enrolling themselves in schools where the school environment is considerably low, it is natural for them to be low on academic orientation. The implication is that if it is a private high quality school, those from high and average social class origin possessing academic oriented characteristics get access and develop their academic oriented behaviours. On the contrary, if they are from working class background they may find themselves in low quality schools and end up with low academic oriented behaviours. It appears that the two social class groups differ considerably on academic orientation and the difference gets widened due to cumulative effect. If nothing intervenes to bridge the gap the difference becomes stamped for life. Infact, Mathew effect, the academically rich getting richer, accounts for the occurrence of this difference (Walberg, 1991; Yates and Chandler, 1991).

However, the trend is different in the rest of the schools. Both public high quality schools with higher teacher-student ratio and management systems varying from average to moderately effective maintain higher work ethics. Of course, both schools are peopled by students from heterogeneous social class background and lack adequate facilities. In this background, the student groups of public high quality school-C, vary from low to high on academic orientation and those from public high quality school-D vary from low to average on academic orientation indicating within school variation among groups. By and large, the student groups, except the high social origin group, perceive the environments of their schools as either average or high. It is important to note that both schools have above 83% of pass in class X but they differ on academic orientation. Though high pass percentage is a reflection of the existing school environment and work ethics, perhaphs, the heterogeneous student composition with considerable number from low social class group in school-D and to a lesser extent in school-C, and the related behavioural patterns can be attributed to the differences in academic orientation. Moreover, these students rarely attain above 60% marks but they do manage to secure pass percentage and it is of high value to them. With regard to public and private average quality schools, the management system varies from weak to average but the public schools have relatively higher teacher-student ratio. With students from heterogeneous social class origin, within school variation on academic orientation is considerably high.

Except the groups from school-H, the rest of the groups perceive that the school environment is either average or high.

What is striking is the tendency among average and low social class origin students attending public high quality and to a certain extent average quality schools as well as private average quality schools to perceive their respective school environments as average or high. Where as the students from high social class origin attending public high and average quality schools as well as those from high and average social class attending private high quality schools perceive their school environments as average or low. What does it imply? It appears that students from affluent sections of the society by virtue of their social class advantages are likely to get access to a variety of opportunity for socialization and get more academic input from home and other agencies besides what they derive from school. Naturally, they may not perceive school environment as that effective. On the contrary, those who are less affluent and depend primarily on schools for academic oriented behaviours consider school environment as important and perceive it as effective.

If one examines the student groups irrespective of the schools they attend, students from high social class origin are highly academic oriented and those from low social class origin are considerably low on academic orientation. Ofcourse, those from average social class origin vary from low to moderately high on academic orientation. It simply means that academic oriented behaviours vary by the social class origin of students.

Interestingly, homogeneity phenomenon is observed among the groups of private high quality schools as well as private and public low quality schools. For instance, if the dominant group within a school is highly academic oriented and average on school environment, the minor group(s) too show the same pattern on both dimensions. Homogeneity among groups on the planes of academic orientation and school environment, academic orientation and language proficiency-missing class, and school environment and language proficiency - missing class within school is highly visible in private high quality schools, and private and public low quality schools. In public high quality school-D and public average quality school-H homogeneity is found on the planes of

school environment and language proficiency - missing class. Thus, homogeneity means the tendency of students attending a particular school to show similar patterns of behaviour.

On language proficiency students of private schools appear to be high. It seems that students from public schools are more prone to miss classes. Same tendency is also observed among the students of one of the private high quality schools and private low quality school. Student participation in political activities is not unusual in Kerala and student strikes are common in the state. Students' tendency to miss class should be viewed in the context of student politics and related activities.

Thus the emerging evidences substantiate the first hypothesis; there exist significant differences between-private and public schools by school factors, student characteristics (factors) and school achievement, and the differences can be characterized interms of a few dimensions. The derived dimensions i.e. management system, teacher-student ratio, school facility - work ethics, academic orientation, school environment and language proficiency - missing class differentiate schools However, sharp differences exist between private and public schools on the planes of management system and teacher-student ratio as well as academic orientation and school environment. The evidences, further, substantiate the conception of school context as the product of school factors, student factors and school achievement. School context is a product of the inter-relationships among the critical elements involved in performing its functions and the level of attainment. The planes of derived dimensions do provide a context to understand a school.

In addition, the context perspective provides a frame to identify the existing strength and weakness of a school . For instance, on the plane of academic orientation and school environment (Fig.3.11a, P.35) student groups from high quality school - C, are located at different points. While the students from high social class (5) are highly academic oriented, those from average social class (6) and low social class (7) are moderate and low on academic orientation respectively. Though for groups, 6 and 7 the school environment is average, it is relatively low for group, 5. The evidences may facilitate to develop insight into the nature of groups and formulate educational strategies to suit their respective levels.

impact of school and student factors

Evidences related to the third question are obtained separately for school factors and student factors as well as by combining the selected variables from both sets. When the school factor variables are entered in the regression equation, school environment and its components i.e. overall quality (OQ_2), academic emphasis and teacher-student relationship have emerged as the most effective variables for predicting school achievement. Given effective school environment conditions, students from high social class origin are expected to do well in school achievement, followed by those from average and low social class origin groups. When student factor variables are treated in the regression equation, educational aspiration, intelligence, language proficiency - linguistic level, nursery education, success-effort, failure-lack of effort and failure-subject difficulty are found to be the most potential variables for predicting school achievement. In the context of these student attributes, those from high social class origin will attain higher school achievement followed by those from average and low social class origin groups.

It is important to note that while 48% of the groups' (33) school achievement can not be predicted effectively by these school factor variables alone, 27% of the groups' school achievement can not be predicted just by student factor variables.

The combined evidences suggest that intelligence, educational aspiration, school environment, language proficiency-linguistic level and academic emphasis are the most potential variables which can predict school achievement effectively. The implication is that besides student factors, what teacher does in school to provide manipulable conditions which reflect the academic emphasis and the overall school environment are critical for school achievement. Academic emphasis indicates the quality of tasks teachers provide to enhance students' engagement in academic work. This evidence to a certain extent support Newmann's theory of student engagement (Newmann, 1989). In the context of these variables those from high social class origin are likely to attain higher school achievement followed by those from average and low social class origin groups. It appears that only 18% of the groups' school achievement can not be predicted by the variables in the combined model. The importance of social class origin in school

achievement is highly visible in all the three models. These results provide substantial evidences to the second and third hypotheses. In fact, both student and school factor variables are important in explaining school achievement. Though student factors appear to be more important, the main concern is whether both student and school factors play their respective roles. The evidences illustrate that they do play their roles.

Evidences, thus, suggest considerable degree of inequality in the student composition and academic orientation among schools. The schooling system runs along the line of social class character of the society. This is what the data from Kerala indicate. There is no reason to believe that this is not true in the rest of the country. Why does it happen? Is it because the stratified schooling system is a natural consequence of the stratified nature of the existing society? Or is it because of man's individualistic motives? Or is it because people are unconcerned about the schooling system?

Conclusions

- The emerging trend suggests that private high quality schools have effective management system and low teacher-student ratio. Using selective admission policy they select students from affluent sections of the society. These students are highly academic oriented and the school environments are either average or relatively low.
- On the other extreme, private and public low quality schools, despite low teacher-student ratio have weak management system and follow open door admission policy. These schools are peopled by students from working class background who are considerably low on academic orientation and the school environments are too low for them.
- Public high quality schools with higher teacher-student ratio and the management system varying from average to moderately effective maintain higher work ethics. With open door admission policy these schools are peopled by students from hetergeneous social class background and lack adequate facilities. They vary from low to high on academic orientation. With regard to public and private average quality schools, the management system varies from weak to average. Public schools have higher teacher-student ratio. With students from heterogeneous social class origin, with in school variation on academic orientation is considerably high.

- In general students from public high quality and average quality, and private average quality schools perceive that the environments of these schools are either average or high. It is likely that those who are less affluent depend primarily on schools for academic oriented behaviours and consider school environment as important, and perceive it as effective.

- As compared to private schools, teacher-student ratio is high in public schools. Indeed, work ethics is high in public high quality schools.

- If the student groups are considered on social class origin, those from high social class are highly academic oriented and on the contrary, those from low are considerably low on academic orientation.

- Homogeneity phenomenon i.e. the tendency to show similar patterns of behaviour among students of the same school is highly visible in private high quality, and private and public low quality schools.

- Differences among schools are more sharp if they are compared across the quality level of private and public schools rather than treating them merely as private and public schools. Quality level needs to be considered from the context perspective and the evidence from this study substantiates this view. The planes of the derived dimensions explain the context of each school and provide a frame to understand its quality. It also provides a frame to study each school in-depth.

- Evidence further suggests that among school and student factors intelligence, educational aspiration, school environment, language proficiency - linguistic level and academic emphasis are the factors critical to school success. Social class origin invariably has important consequences for predicting school achievement.

- The emerging trend suggests that the school system runs along the line of stratification system of the society. This is what the evidence from Kerala indicates. There is no reason to believe that this is not true in other parts of the country. Should it be changed or accepted in the present form?

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Appendix - A

SCHOOL INVENTORY (for teachers)

Educational Qualifications ____________________ Teaching Experience ________________

School ___________________________

Following are a few statements about your professional role in the school. Read each statement and reflect to what extent it is practised by you as well as by the school. Choose the most appropriate answer for each statement by putting a ( ) mark. Remember, your honest answer is most important and it will be kept confidential. Answer all the items.

1. Is there any check on your work in the school by the authorities - management, headmaster etc? (Ex. of work-planning daily lessons, home work, teaching, co-curricular activities etc).	Yes	No	
If yes, state the frequency	Once in a while	Frequently	Regularly
2. Do the authorities have control on your work?	Yes	No	
If yes, indicate the level of control	Low	Moderate	High
3. What is the quantum of work that you perform in the school?	Low	Moderate	High
4. How often do you undertake activities like planning lessons in advance, giving and checking home work, testing, attending to students' needs and problems, conducting co-curricular activities, helping students beyond school hours etc besides regular teaching?	Once in a while	Frequently	Regularly
5. Does this school have facilities with respect to:			
a. Library? (interms of variety of books, reading material, reading room, regular use of students and teachers)	Low	Moderate	High
b. Laboratory? (interms of physical facility, equipments/materials and regular use of laboratory for teaching science lessons)	Low	Moderate	High

c. Sports and games? (interms of play field, play materials, regular play, variety of games and athletic events, participation by students)	Low Moderate High
d. Organising activities for promoting students' interests? (ex. painting, debate, dance, science club, language club, similar activities)	Low Moderate High
How much effort do you use in performing your work (teaching)? (ex. explaining ideas, using teaching aids, giving examples, individual attention etc).	Low Moderate High
What is the level of your commitment to teaching profession?	Low Moderate High
Are you systematic in performing your work? (ex. preparing for the class well in advance, completing the lessons in time, conducting regular unit test, giving marks to students in time etc.)	Low Moderate High
Do you consult colleagues or refer books while performing your professional duties? (ex. teaching methods, latest developments in the subject matter, student behaviour etc.)	Never Occasionally Frequently Regularly
Do you adopt new ways of teaching in the class?	Never Occasionally Frequently Regularly
Do you follow the rules of the school? (ex. going to classes in time)	Rarely Sometimes Always
Indicate the overall quality of your school.	Low Moderate High

Appendix - B

SCHOOL INVENTORY (for headmaster/headmistress)

Following are a few statements about your school. Read each statement and indicate accurate answer to each item.

1. Admission policy of this school is :	Not at all selective	To a certain extent selective	To a large extent selective	Highly selective

2. Total number of students studying in the school ______________________

3. Total number of teachers working in the school ______________________

4. Fees charged per student annually ______________________

5. Total expenditure incurred per year (includes salary of teachers and other staff, expenditures on library, laboratory, furniture, building, play materials, teaching aids and related items in a year - current year) Rs. ______________________

6. Facilities available in the school with respect to:

a. Library (interms of variety of books reading materials, reading rooms, regular use by students and teachers).	Low	Moderate	High
b. Laboratory (interms of physical facility, equipment/materials and regular use of laboratory for teaching science lessons).	Low	Moderate	High
c. Sports and games (interms of play field, play materials, regular play, variety of games and athletic events, participation by students).	Low	Moderate	High
c. Organizing activities for promoting students interests (painting, debate, dance, science club, language club and similar activities).	Low	Moderate	High
7. Indicate the overall quality of your school.	Low	Moderate	High

Appendix-C

SCHOOL ENVIRONMENT SCALE

Name ______________________ Class ______________

School ____________________ Sex ______________

The following are a few statements about your school. For each statement there are three answers. Read each statement carefully and put a (✓) mark on ONE of the answers which may describe best the practices in your school. Read carefully and answer all the items.

1. Students really enjoy attending classes in this school	Rarely	Some times	Always
2. This school is famous for its academic standard	Rarely	Some times	Always
3. Teachers use examples, diagrams etc to explain difficult ideas and principles in the class	Rarely	Some times	Always
4. A variety of activities are given while teaching each lesson.	Rarely	Some times	Always
5. Students understand what teacher teaches in the class	Rarely	Some times	Always
6. Every student is completely involved in classroom learning	Rarely	Some times	Always
7. Each student has to complete a lot of home work every day	Rarely	Some times	Always
8. In this school students have to attend classes regularly.	Rarely	Some times	Always
9. Students have to work for higher marks in this school	Rarely	Some times	Always
10. Teachers and students in this school like each other	Rarely	Some times	Always
11. Students meet and discuss their school and personal problems with teachers	Rarely	Some times	Always
12. Students are free to ask questions or doubts to teachers at any time.	Rarely	Some times	Always
13. In this school students have to read in the school library every day.	Rarely	Some times	Always

14. School provides facilities for variety of games and sports	Rarely	Some times	Always
15. Students get opportunity to participate in a variety of activities like music, dance, painting, quiz, elocution, debate, drama etc.	Rarely	Some times	Always
16. Students in this school are well disciplined	Rarely	Some times	Always
17. Students break the rules of the school	Rarely	Some times	Always
18. Students arrive at school on time every day.	Rarely	Some times	Always
19. Students' involvement in learning in this school as compared to other schools is	Less than other schools	Same as other schools	Higher than other schools
20. Teaching in this school as compared to other schools is	Less than other schools	Same as other schools	Higher than other schools
21. Academic reputation of this school, as compared to other schools is	Less than other schools	Same as other schools	Higher than other schools

PERSONAL CHARACTERISTICS TOOL

Name ______________________ Class ____________

School ______________________ Sex ____________

On the following pages there are a number of statements about your school and yourself. Each statement becomes meaningful if you connect it with any one of the given answers. It has different parts. Instructions for each part is given at the beginning. Read the instructions carefully and answer all the items. Please do not omit any item.

Part - 1

For each statement there are three answers. Please select ONE answer which may describe your characteristics better for each statement. Remember, out of the three anrwers, select only ONE by putting a tick mark (✓) on the number of the answer. Answer all the items.

1. In accomplishing a task I like

   a. to be neat and clean
   b. to do it much better than others
   c. to finish it before time.

2. When working in groups I desire

   a. to take the lead
   b. excel others in similar tasks
   c. to do every thing in orderly fashion.

3. My aim of life is

   a. to make a long record of successful achievement
   b. to serve my nation
   c. to attain high status in the society

4. I frequently desire
   a. to be a popular social reformer
   b. to achieve social status
   c. to get sufficient power in my hand

5. In whatever work I under take

   a. I like to make advance plans
   b. I like to do my very best
   c. I like to assume full responsibility

6. It is my nature

   a. to keep things neat and orderly
   b. to do things for my friends
   c. to undertake tasks which require great skill.

7. I frequently aspire to be

   a. a person with wonderful achievements
   b. a very rich person
   c. a happy-go lucky person.

8. I am happiest when

   a. making others happy
   b. successful in my work
   c. I become the centre of others attention

9. My ambition in life is

   a. to enjoy a happy married life
   b. to obtain a highly paid job
   c. to establish a glorious record of achievement

10. I have a general tendency

   a. to continue a work till it is finished
   b. to analyse others judgement critically
   c. to be polished in manners

11. I am often tempted

   a. to undertake very difficult tasks
   b. to see new places and new people
   c. to be sympathetic with those who are unhappy

12. I am

   a. tolerant of people who hurt me
   b. a morally up-right person
   c. determined to work toward a high goal.

13. I will be very happy if

   a. I can do something very valuable
   b. I can learn a lot
   c. I can be my own boss

14. I like

   a. to be faithful to my friends
   b. to be systematic in my work
   c. to do my best in whatever work I undertake.

15. I wish I could have always been

   a. successful in doing difficult work
   b. generous with friends
   c. sympathetic to the sick and poor

Part - II

For each statement THREE answer -- ALWAYS, SOMETIMES, AND RARELY are given. You are requested to choose one answer which describes the way you study the subject matter for each statement. Put a tick mark (✓) on the answer you have selected for each statement.

1. While studying I prepare the subject matter in detail	Always	Sometimes	Rarely
2. I identify the important terms, principles and ideas in each subject matter and learn them.	Always	Sometimes	Rarely
3. I summarize the subject matter in points and diagrams	Always	Sometimes	Rarely
4. While preparing for examination, I review what I have already studied.	Always	Sometimes	Rarely
5. When I start studying a lesson I begin by reviewing the preceding lesson.	Always	Sometimes	Rarely
6. When I read a book or notes I stop once in a while to recall the most important points	Always	Sometimes	Rarely
7. While studying, I try to think of examples of principles or ideas.	Always	Sometimes	Rarely

8. While reading lessons, I formulate questions and write answers to those questions.	Always	Sometimes	Rarely
9. While taking notes I state the ideas in my own words.	Always	Sometimes	Rarely
10. I only study the books and notes which are required for the examination	Always	Sometimes	Rarely
11. I only learn for an examination what I am required to know.	Always	Sometimes	Rarely
12. I skip lessons in a book while preparing for an examination	Always	Sometimes	Rarely
13. I fix up a time schedule for studying lessons.	Always	Sometimes	Rarely
14. I plan my work in advance	Always	Sometimes	Rarely
15. I keep up the study schedule once I have made it.	Always	Sometimes	Rarely
16. As a rule I study a few hours a day.	Always	Sometimes	Rarely
17. I study the lessons throughout the year.	Always	Sometimes	Rarely
18. I study irregularly	Always	Sometimes	Rarely
19. I attend class	Always	Sometimes	Rarely
20. I attend class only if I feel like it.	Always	Sometimes	Rarely
21. I attend class irregularly	Always	Sometimes	Rarely
22. I note down the points the teacher says in the class.	Always	Sometimes	Rarely
23. I elaborate the class notes at home.	Always	Sometimes	Rarely
24. Before going to class, I go over my notes or the last class.	Always	Sometimes	Rarely

Part - III

Choose any ONE which you think is true in your case from the given alternatives for the following item.

1. Upto which level, are you planning your studies?

Class X	Graduation
Pre degree	Post graduation
Technical course	Professional course
	Research course (Ph.D.)

Part - IV

1. Do you get pass marks (40%) in all the subjects in the present class? (Use class test marks to arrive at your decision) Yes No

Choose only ONE which is true in your case from the given alternatives for the following two items.

If YES, is it because

1. of your ability
2. of your hard work
3. subject matter (lesson) is easy

If No, is it because

1. you do not have the ability
2. you do not work hard
3. subject matter (lesson) is difficult.

Part - V

Choose only ONE which is true in your case from the given three answers for the following items.

1. My parents always know where ever I am and what ever I do	not at all	to a certain extent	to a great extent
2. My parents keep close watch on how well I am doing in school	not at all	to a certain extent	to a great extent
3. My parents encourage me to go for further studies after X class	not at all	to a certain extent	to a great extent

Part - VI

Write your answers in the space provided for the following items.

1. Since last June, how many times have you been in school and deliberately missed classes? ____________________ (number of times)

2. Since last June, how many times did you participate in students' strike ____________________ (number of times)

Part - VII

State the following information about your family in the space provided against each item given under 1.

1. a. Education of Father ____________
   b. Education of Mother ____________
   c. Occupation of Father ________________________
   d. Occupation of Mother ________________________
   e. Family Income ______________________
   (amount per month)

2. Did you attend nursery school before entering class 1 ? Yes No

കൽക്കരിയോ വിറകോ കത്തിച്ച് വെള്ളം ആവിയാക്കുമ്പോൾ പുറത്തു വരുന്ന പുക അന്തരീക്ഷത്തെ മലിനമാക്കുന്നുണ്ട്. എന്നാൽ, ഈ മാലിന്യം താരതമ്യേന ലഘുവും വേഗം ശുദ്ധീകരിക്കപ്പെടാവുന്നതുമത്രെ. അണുശക്തി ഉപയോഗിച്ച് ആവി ഉണ്ടാക്കുമ്പോൾ വരുന്ന കൂടുതൽ മാലിന്യമാകട്ടെ, അത്യന്തം തീവ്രവും മാരകവും ചിരസ്ഥായിയുമാകുന്നു. അണുശക്തി ഉല്പാദിപ്പിക്കുന്നതിന് ഉപയോഗിക്കുന്ന ഇന്ധനം മാരകമായ അണുപ്രസരമുള്ളതാണ്. അതിന്റെ ഏറ്റവും ചെറിയ അംശംപോലും ജീവജാലങ്ങൾക്ക് ശാശ്വതമായ ഹാനി വരുത്തിവെക്കും. അണുവൈദ്യുതനിലയങ്ങളിൽ ഉപയോഗം കഴിഞ്ഞു പുറംതള്ളുന്ന ഇന്ധനവും മറ്റു മലിന വസ്തുക്കളും ഭൂമിക്കടിയിൽ വളരെ കട്ടിയുള്ള സിമന്റുപലകകൾകൊണ്ടു തീർത്ത പെട്ടികളിൽ കുഴിച്ചിടുകയാണ് ഇപ്പോൾ പതിവ്. മലിനവസ്തുക്കൾ അധികമാകുന്ന തോതിന് അവയുടെ "ശവമടക്കൽ" വലിയൊരു പ്രശ്നമായി തീർന്നിട്ടുണ്ട്. അണുകേന്ദ്രത്തിനുള്ള സംവിധാനങ്ങളിൽ വല്ല വിള്ളലോ പിഴവോ ഉണ്ടായാൽ, അതിലൂടെ ബഹിർഗമിക്കുന്ന ഗ്യാസും വെള്ളവും മറ്റും പരിസരത്തെ ആകെ വിഷദൂഷിതമാക്കും. 1979-ൽ അമേരിക്കയിൽ പെൻസിൽവാനിയ സ്റ്റേറ്റിലെ "ത്രീ മൈൽ ഐലന്റ്" എന്ന സ്ഥലത്ത് ഇങ്ങനെ ഒരപകടം ഉണ്ടായത് ആ രാജ്യത്തിലെ ജനങ്ങളെയാകെ ഭയചകിതരാക്കി. അതിന്റെ ദുഷ്ഫലങ്ങൾ ഇനിയും ഒഴിവായിട്ടില്ല. ഈ സംഭവത്തെത്തുടർന്ന്, അണുശക്തി ഉപയോഗിച്ച് വൈദ്യുതി നിർമ്മിക്കുന്നതിന് പുതിയ ഒരൊറ്റ ഏർപ്പാടും 1979-നു ശേഷം അമേരിക്കയിൽ തുടങ്ങിയിട്ടില്ല. അവിടെ ആകെ ഉല്പാദിപ്പിക്കുന്ന വൈദ്യുതിയുടെ 11.4 ശതമാനം മാത്രമാണ് ഇപ്പോൾ അണുശക്തി കൊണ്ടു നിർമ്മിക്കുന്നത്. വൈദ്യുതി ഉല്പാദിപ്പിക്കുന്നതിന് ഉപയോഗിക്കുന്ന മറ്റ് ഇന്ധനങ്ങളായ എണ്ണയുടെയും കല്ക്കരിയുടെയും വില പിടികിട്ടാത്തവിധം ഉയർന്നു പൊയ്ക്കൊണ്ടിരിക്കുന്ന കാലത്താണ് ഇതെന്ന് ഓർക്കണം. അണുവൈദ്യുതി അടുത്തെങ്ങും ലാഭകരമാകാൻ പോകുന്നില്ല എന്നു പല അമേരിക്കക്കാരും കരുതുന്നു. ഊർജ്ജത്തിന് നാം പഴയ പാരമ്പര്യ സ്രോതസ്സുകളെത്തന്നെ ഇനിയും വളരെ കാലം ആശ്രയിക്കേണ്ടിവരും.— വിറക്, കൽക്കരി, എണ്ണ മുതലായവയെ. മനുഷ്യന്റെയും മൃഗങ്ങളുടെയും മലം, ചപ്പുചവറുകൾ മുതലായവ ഉപയോഗിച്ച് ഊർജ്ജമുണ്ടാക്കുകയാണ് മറ്റൊരു മാർഗം. ഇതിൻഫലമായി പരിസര മലിനീകരണം വളരെ കുറയുമെന്ന മെച്ചവുമുണ്ട്.

ഫ. (A)

1. കൽക്കരിയോ വിറകോ കത്തിച്ച് വെള്ളം ആവിയാക്കുമ്പോൾ പുറത്തുവരുന്ന പുക അന്തരീക്ഷത്തെ മലിനമാക്കുന്നുണ്ട്. ഈ മാലിന്യവും, അണുശക്തി ഉപയോഗിച്ച് ആവിയുണ്ടാക്കുമ്പോഴത്തെ മാലിന്യവും തമ്മിലെ വ്യത്യാസം എന്ത്?.

2. ഊർജ്ജത്തിന്റെ പഴയ പാരമ്പര്യ സ്രോതസ്സുകൾ ഏവ?.

3. "ത്രീ മൈൽ ഐലന്റ്" എന്ന സ്ഥലത്ത് എന്തപകടമാണ് ഉണ്ടായത്? ഇതിന്റെ ഫലമെന്ത്?.

4. വൈദ്യുതിയുടെ ഉല്പാദനത്തിന് അണുശക്തി അധികമധികം ഉപയോഗിക്കുന്നതുകൊണ്ട് അമേരിക്കയ്ക്ക് ചെലവു കൂടുകയാണോ അതോ കുറയുകയോ? നിങ്ങളുടെ അനുമാനത്തിന് ആധാരമായി ലേഖനത്തിൽ കാണുന്ന വാക്യമേത് എന്ന് നിർദ്ദേശിക്കുക.

5. അമേരിക്കൻ അനുഭവം അണുവൈദ്യുതി നിലയങ്ങളെ സംബന്ധിച്ചിടത്തോളം ഇന്ത്യയ്ക്ക് എന്തു പാഠം നല്കുന്നു? എങ്ങനെ?.

6. "മനുഷ്യന്റെയും മൃഗങ്ങളുടെയും മലം, ചപ്പുചവറുകൾ മുതലായവ ഉപയോഗിച്ച് ഊർജ്ജമുണ്ടാക്കുകയാണ് മറ്റൊരു മാർഗ്ഗം" — ഈ മാർഗ്ഗം ഇന്ത്യയിൽ കൂടുതൽ ഫലപ്രദമാവുമോ ഇല്ലയോ? രണ്ടായാലും, എന്തുകാരണം കൊണ്ട്?.

ബി (B)

1. ഖണ്ഡികയിലെ ഒന്നും രണ്ടും വാക്യങ്ങളിലെ ആശയങ്ങൾക്കു തമ്മിലുള്ള അന്തരം കാണിക്കാൻ നിശ്ചിതമായ ഒരു വാക്കുപയോഗിച്ചിട്ടുണ്ടല്ലോ — ഏതാണു് ആ വാക്കു്?

2. "വേഗം പ്രത്യക്ഷമാകുന്നതു്" — രണ്ടാം വാക്യത്തിലെ ഈ വിശേഷണത്തിനു വിപരീതമായി മൂന്നാം വാക്യത്തിൽ ഉപയോഗിച്ചിരിക്കുന്ന വിശേഷണം ഏതു്?

3. "ഗണനീയമായി പരിസരമലിനീകരണം വളരെ കുറവുമെന്ന മെച്ചവുമുണ്ടു്" — ഇവിടെ "മെച്ചവും" എന്ന വാക്കിലെ "ഉം" എന്തുദ്ദേശിച്ചാണു് പ്രയോഗിച്ചിരിക്കുന്നതു്?

4. അണുവൈദ്യുതി നിലയങ്ങളിൽ ഉപയോഗം കഴിഞ്ഞ ഇന്ധനവും മറ്റു മലിനവസ്തുക്കളും നീക്കം ചെയ്യുന്നതിനു് ഇപ്പോൾ നിലവിലുള്ള പ്രക്രിയയെ ലേഖകൻ "ശവസംസ്കാരമായി" കല്പിക്കുന്നു. ഈ പൊരുത്തത്തിനു് ആധാരമായ സാദൃശ്യം എന്തൊക്കെയാവാം?

Appendix - F

SCIENCE ACHIEVEMENT TEST

Name ____________________ Class ____________________

School ____________________ Sex ____________________

Below given are a few questions from science. Read each question carefully and answer all the items.

Select the most appropriate answer for question 1,2 and 3 given below by putting a tick mark (✓) on the number of the answer.

1. A bar magnet shows its property more strongly at

i. the middle of the magnet
ii. one end of the magnet
iii. both ends of the magnet
iv. the point between the middle and end of the magnet.

2. The space around a magnet in which the magnetic force is exerted is known as

i. electric field
ii. magnetic field
iii. magnetic poles
iv. magnetic induction

3. Temporary magnets are made of

i. tungsten
ii. soft iron
iii. alnico
iv. copper

Answer the following questions:

4. A copper wire is held above a compass needle which shows the North-South direction. The wire is connected to a battery and a switch.

When the switch is put on, the compass needle deflects from the north-south direction and when it is put off compass needle returns to north-south direction. STATE THE REASON

. When a glass sheet or card board is brought near a magnet, it is not attracted by the magnet. But if a piece of glass or card board is placed above the magnet and iron filings are sprinkled over the glass or card board, the filings are attracted by the magnet. STATE THE REASON.

. A bar magnet is placed on a table. Pin 'A' is placed close to one pole of the magnet so that it stays there but does not touch the bar magnet.

What will happen if you bring a second pin 'B' near pin 'A'? Explain briefly with a suitable diagram.

Select the most appropriate answer for question No.7 by putting a tick mark (✓) on the answer number.

. Iron nail 'A' is placed at a distance of 2 cm from the north pole of a magnet. Iron nail 'B' is placed at a distance of 4 cm from the north pole of the same magnet. Some pins are brought near nail 'A' and nail 'B'. What will be the effect?

i) nail 'B' will attract more number of pins than nail 'A'.

ii) nail 'A' will not attract any pin.

iii) nail 'B' will attract less number of pins than nail 'A'.

iv) nail 'A' and nail 'B' will not attract any pin.

You are given two bar magnets whose poles are not marked. You do not know which the north pole and the south poles are. Some thread and a wooden stand are also provided.

Describe a procedure to identify the poles of the two magnets with the help of diagram wherever necessary.